Soil/Sediment Interaction with Ground and Surface Water During Lake Recovery
Potential Biological Treatment Measures
1998 - 2003
Laboratory Simulations

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Boojum Research Limited

Key Lake Operations

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1.0 Background and Introduction

Mining of the Gaertner and Deilmann uranium ore-bodies at Key Lake required extensive dewatering measures. These measures were initiated in the late 1970s and resulted in the full or partial drainage of several surface water bodies within the immediate project area. Gravity drainage/pumping were used in combination with dewatering wells to lower the groundwater table.

After conclusion of the mining operations in the late 1990s, dewatering operations were significantly reduced, resulting in the ongoing recovery of ground- and surface waters within the project area and partial flooding of the mined-out open pits. Former Seahorse and Hourglass Lake, up-gradient of the Gaertner Pit, recovered relatively fast in the early 2000s and reached about 50 % of their original water-body volume in 2005. This quick recovery was caused by the cessation of pumping from several Gaertner wells and the discharge of water from the Deilmann Tailings Management Facility (DTMF) wells into the Gaertner Pit.

Strategic pumping from Hourglass and Huey Lake to the neighbouring watershed was commenced in 2004 to maximize the diversion of clean surface water away from the Key Lake pump-and treat systems, in order to minimize further flooding of the Deilmann Pit and to control related slope stability issues.

During the early flooding period of the Gaertner Pit in the early 1990s, Boojum Research Ltd. assessed the likelihood of elevated solute concentrations in the recovering surface waters within the Key Lake project area. The sediments in the dewatered lakes had been exposed to the atmosphere for many years and there was a concern that the resulting iron oxidation could lead to pH depressions and subsequent release of Ni during and after lake recovery. The levels of nickel were of particular interest, as higher concentrations of nickel in the sediments were mostly found in material with high organic content. This material was likely decomposed during the period of atmospheric exposure, and hence more likely to release contaminants.

Cameco's review of the water quality in existing residual lakes, where the sediments were only partially exposed, indicated in the mid-1990s that all potential contaminant concentrations were well within SSWQO. Hence, Cameco felt that man-made and natural surface features within strategic lake recovery zones could be easily modified via geotechnical/structural measures and that, if need be, chemical/biological treatment measures would contain any contaminants, released by the sediments. Boojum Research Ltd. was retained by Cameco to address any potential concerns with respect to biochemical lake bottom characteristics and surface water quality during advanced lake recovery.

In September, 1999, Boojum Research Ltd. issued the results of their multi-year investigation program within a major report ("Surface Water Quality Projections for Key Lake Mining Operations, Year 2000 to 2005, Laboratory and Field Work"). Mainly based on extensive field survey/sampling of exposed lake bottom sediments and short-term leaching experiments, Boojum concluded that nickel and Ra-226 concentrations may moderately exceed SSWQO in various lakes during the advanced recovery phase. However, Boojum recognized that biochemical model predictions may be very conservative, considering drainage basin dynamics and the related dilution effects due to fresh water run off, infiltration and natural groundwater fluctuations. Monitoring results, obtained in 2004/2005 from the recovering Hourglass and Seahorse lakes, appear to confirm that Boojum's original water quality predictions with respect to Ra-226 concentrations are in fact conservative.

In 2005, average Ra-226 concentrations from several monitoring stations in these lakes ranged from 0.01 to 0.05 Bq/L, i.e. the actual concentrations remained well within the SSWQO of 0.11 Bq/L and were far below the values of 0.14 Bq/L and 0.19 Bq/L, respectively, predicted by Boojum for the fully recovered lakes. On the other hand, mean nickel concentrations in the recovering Hourglass and Seahorse lakes ranged from 0.025 mg/L to 0.035 mg/L respectively, i.e. the actual concentrations are close to the SSWQO of 0.025 mg/L and somewhat above the value of 0.01 mg/L, predicted by Boojum. This led to Cameco's decision to focus on nickel issues within this follow-up report. Response

Based on its earlier work (summarized in the 1999 report), Boojum also concluded that short term leaching experiments do not adequately reflect the complexity of the biogeochemical interactions that could lead to metal release within the re-saturated subsurface in the recovered lakes and that it was impossible to accurately predict their eventual outcome. Gradual and long-term changes might be encountered within the saturated subsurface in the recovered lakes. Predicting the impact of these interactions on the oxidation products, released from depth below the lake sediments, up through to the dewatered zone appears unrealistic. This conclusion is obvious considering the interaction of sand layers with clay-, iron- and organic containing strata. All these strata have high surface adsorptive reaction capacities and varying biogeochemical re-activities with respect to metal release. Therefore, theoretical projections to assess the surface water concentrations are not made, but rather various individual strata are assessed under saturated conditions and columns were set up to measure empirically diffusive release from numerous, strategically selected locations (Map 1 and 2 of the 1999 report).

Lake bottom cores to a depth of about 1 m were obtained in acrylic tubes and samples from various depth zones were saturated in the laboratory with distilled water. Subsequently, the surface water, covering the saturated strata, was removed and replaced during each monitoring event to reflect diffusion processes from the saturated subsurface to the lake water. The individual soil/sediment strata were saturated in a low oxygen environment (container head space filled with nitrogen) and the overlaying water as well as the water within the strata was monitored over a 4-year period to reflect long term changes. However, beyond the evaluation of potential impacts on the water quality of the recovering lakes, the experiment was also designed to assess the effects of the addition of Easily Degradable Organics (EDO). This approach may re-activate microbial reduction processes, which normally, in undisturbed sediments, create a sink for contaminants.

It was noted early in the assessment, that little has been reported in the scientific/technical literature on the long-term revitalization of oxidized sediments. Hence, Cameco decided proactively to extend the investigation over a relatively long observation period. The scope of work included the long-term monitoring of basically two experiments, addressing "normal" lake recovery effects, by saturating soil/ sediment strata with Key Lake ground water, and the impact of revitalization measures, using EDO addition, towards the end of the monitoring period to the same saturated material. . By identifying locations within the project area where a long term contaminant source was apparent, the application of easily degradable organic (EDO), stimulating microbial sediment activity within recovered surface water bodies, was to be tested. The detailed scope of work, based on the above considerations, is summarized below.

Boojum's 1999 report characterized the soil/sediments with respect to Ni mobility from depth profiles, excavated along transects established in Hourglass and Lower Seahorse Lake. The extended monitoring program was designed to determine if only an initial release of Ni from more critical soil/sediment materials would be expected as compared to an extended, slow diffusion-based release. In addition, these experiments would also explore whether desiccated sediments could be revitalized by the addition of organic matter. Healthy sediments generate a relatively high pH and a reducing environment, which would prevent Ni diffusion upwards to the recovering surface waters. The results of the long term monitoring program as well as the effect of the addition of EDO are described in this report.

2.0 Monitoring, Sampling and Analysis

<u>Saturated Strata:</u> To simulate post-flooding reactions in individual soil/sediment strata, 102 glass jars, each with a volume of 1000 mL, were filled with 300 mL of soil/sediment and 700 mL of Key Lake ground water. A total of ten jars were set up in replicates using double distilled water as well as Key Lake water alone and in combination with commercial, acid washed (HNO_3) sand. These ten jars were used as controls/blind samples. Pore-water samplers (acid washed silica aquarium aeration stones on a 25 mL syringe) were installed in the 300 mL soil/sediment material to facilitate collection of pore-water from the saturated (sediment/soil) strata zone. This water is referred to as Saturated Zone Water (SZW). The water above the saturated soil/sediment zone represents Overlaying Saturated Zone Water (OSZW).

The head space of the jars was filled with nitrogen gas to simulate a low oxygen environment. All jars were closed with a lid through which the syringe was installed. After each sampling event, the head space of the jar was recharged with nitrogen(pictured in Plate 1, Appendix 1). Table 1a summarizes the monitoring/amendment schedule of the OSZW. Between 1998 and 2000, OSZW samples were collected to monitor water quality and to assess specifically the release of Ni and Fe from the soil/sediments. During 1998, 3 OSZW samples were collected, one OSZW sample was taken in 1999 and one in 2000. In 2001, 6 OSZW samples were obtained from each sample throughout the year plus 1 pore-water (SZW) sample from the soil/sediments. In addition, 2 g of EDO were added to 54 (nearly 50 %) of the samples. In 2002, ~~the OSZW and~~ 5 g of EDO were added to samples which had not received EDO previously. OSZW was sampled 8 times and SZW once respectively as outlined in more detail below.

On April 2nd, 2002, the 1 litre glass jars were removed from the refrigerator and placed at room temperature, to reflect summer conditions in the field. On the 10th of June, 2002, 5 g EDO was added to 39 (42%) of those samples which had previously not received EDO (potato waste). All samples were left at room temperature but protected from ambient light. Eight samples (11 %) remained without the addition of EDO throughout the duration of the experiment (4.5 years). After the 5 g addition of EDO, the monitoring frequency of the OSZW of the samples was increased to 8 sampling events during 2002, until termination of the experiment on the 18th of August, 2002. Details of this laboratory program are given in Appendix 1. Throughout the entire column/ saturated strata monitoring program, the same technician was employed and the same instrumentation was used to minimize errors introduced by the sampling procedure.

For purposes of chemical analysis, water samples were filtered through 0.45 µm filter paper, acidified with nitric acid and submitted to SRC's (Saskatchewan Research Council) analytical laboratory for determination of Ni and Fe. For the column experiments (discussed below), where decomposition of in-situ organic matter was expected to take place, a quantitative chemical analysis of nitrogen compounds and a complete metal ion analysis were carried out for each sampling event. These data are provided in Appendix 3 as supplementary information, but are not discussed in this report as they may only become relevant in the post-operational phase.

<u>Amended Saturated Strata</u>: At the conclusion of the stirred leaching experiment, described in the 1999 report, the soil/sediments were still covered with Key Lake water. These samples, contained in plastic beakers and covered with parafilm, were stored in the refrigerator. On January 11, 2002, 39 beakers were brought to room temperature and the (Amended Saturated Zone Water) ASZW was monitored for the same parameters as the samples in the Saturated Strata experiment. On January 15, 2002, 2 grams of EDO were added to each beaker. The OSZW was monitored daily until February 4, 2002, when 2 more grams of EDO were added together with natural zero –valent iron (rust). This phase of the experiment was designed to determine if the two amendments, applied in combination, would lead to a pH increase. Details of the monitoring procedure/results are given in Appendix 1.

Core Columns: Eight sediment/soil strata columns, collected from the Lower Seahorse- and Hourglass Lake beds, as described in Boojum 1999 (pictured in Plate 2, Appendix 1), were saturated with distilled water to represent the saturated subsurface and equipped with sampling ports. After some time, Ni was identified in the overlaying water, which could only have arrived there by diffusion upwards from the saturated sediment/soil material. This water is therefore referred to as the Diffusion Product Water (DPW).

In Table 1b, the number of monitoring events is summarized: 3 times in 1999, 5 times in 2000, followed by one monitoring event for each year until dismantling of the columns in 2003. During each sampling event, all of the DPW was siphoned off and replaced with new, distilled water. Additional samples were obtained from the saturated sediment/soil material within the columns via sampling ports in 2002 and 2003. This water represents "Subsurface Strata Water" (SSW). Shortly after set-up, one of the columns was found to be leaking. The leaking column was repaired and all columns were drained and re-filled, to maintain the uniformity of test conditions. The columns were drained again at the end of the experiment in 2003, dismantled and all components analyzed for elemental composition in order to arrive at total Ni released to the DPW. Details of the monitoring activities are found in Appendix 1.

3.0 Results and Discussion

In any ecological system, whether healthy or damaged, the parameters E_H and pH dominate metal state and mobility. For the saturated soil/sediment material, these parameters are important indicators, e.g. for releases from or precipitation within the sediment material. These two parameters reflect the availability of H^+ and electrons which, in turn, dictate the vigor of bacterial communities, especially in the sediment (Stumm and Morgan, 1996). In other words, E_H and pH are both the determinants and the products of eco-system health. In the present experiments, E_H and pH were used to indicate whether or not, and to which degree, the EDO additions stimulated microbial activity in the soil/ sediments, leading to the retention of contaminants in the sediment.

3.1 E_H/pH Diagrams – as Indicators of Change

The effects of organic matter additions to the sediments were assessed with the help of E_H/pH diagrams (or Pourbaix diagrams). A brief explanation of the E_H/pH relationship is given below. The parameters pH and E_H are not independent of each other but are linked by the Nernst equation. Important examples are the oxidation and reduction of H_2O. The following equations describe in a quantitative manner the stability limits of water towards oxidation and reduction:

r oxidation of H_2O according to: $H_2O <==> 0.5\ O_{2(g)} + 2\ H^+$ (1a)

$$E = 1.23\ V - (2.3\ RT/\ F)\ pH \quad (1b)$$

For reduction of H_2O according to

$$H^+ + e^- <==> H_{2(g)} \quad (2a)$$

$$E = 0.00 \text{ V} - (2.3 \text{ RT/F}) \text{ pH} \quad (2b)$$

Equations (1b) and (2b) define the thermodynamic stability limits of water towards oxidation and reduction. In the graphical representation (see Fig. 1), these equations define two lines (given as dashed lines and labeled O_2/H_2O (eq. 1b) and H_2O/H_2 (eq. 2b). Water can be stable only inside the region defined by both lines. The dashes on the top of the field indicate the stability limits of water against oxidation and on the bottom against reduction.

In 1960, Baas-Becking et al. described E_H/pH characteristics of aqueous environments on the basis of more than 6200 E_H/pH data pairs from aquatic environments, obtained systematically in a broad variety of waters collected all over the world. These data were also related to the known E_H/pH regions in which specific organisms live. These regions enclose a boomerang-shaped field within the E_H/pH stability diagram that can be associated with specific microbial groups, thus indirectly identifying regions of microbial activity. Such plots of the E_H/pH values of a particular water body or its sediment provide some diagnostic evidence of major bacterial reactions (Fig. 1).

This information can then be taken one step further, if the stability fields of metals are known from basic thermodynamic data, for instance for the element Fe. It is then possible to assess which metal species is present and which precipitation processes are likely to take place under the observed E_H/pH condition. For purposes of this study, the relevant bio-geochemical microbial groups are indicated in Fig. 1 iron bacteria, denitrifying bacteria, blue-green algae, thio-bacteria and sulfate-reducing microbes which generate hydrogen sulphide for Ni precipitation. In addition to the microbiological information, the E_H/pH fields are calculated and presented in Figure 12 which addresses the major iron couples of oxidized and reduced iron.

3.2 Measurement Variability in the Controls of the Saturated Strata Jars

Control conditions for the saturated soil/ sediment from test areas at Key Lake consisted of sample jars with a volume of 1000 mL, containing nitric acid washed commercial sand with either doubly distilled water or Key Lake water and doubly distilled water as well as Key Lake alone (without sand). Assuming that randomness in the control is minimal, the measurement of E_H and pH values from these controls/blinds (no soil/sediment strata present) should have been very similar for the duration of the experiment. Controls are essential for any experiment, but particularly when the same condition is monitored over a long time period, repeating the same measurements.. However a variety of factors can alter the results of repeated measurements of the same quantity under apparently identical conditions. Full reproducibility of measurements of water quality parameters is not feasible, particularly for E_H and pH. These measurements are influenced by a variety of factors, among them temperature, pressure, organic compounds and microbiological activity. This is particularly true for very dilute water, such as the surface and ground waters at the Key Lake site with their low conductivity and lack of buffering capacity (Table 2).

Since measurements of E_H and pH are inherently neither stationary, nor accurate or precise, it is very important to avoid the risk of misinterpreting noise and insignificant, natural variations. Variability in the measurement may be caused by the measuring instrument itself together with ambient factors which can not be controlled. Therefore, the first task of the current work was to assess the magnitude of randomness in pH and E_H measurements in the absence of the saturated soil/sediment material, i.e. to quantify the measurement variability in the controls. The E_H and pH values of the OSZW of the controls are the record of randomness within this experiment, which determines the choice of statistical methodology used to isolate the possible effects of EDO addition, the subject of major interest in this experiment.

Fig. 2 presents pH in the OSZW of the control samples over the time of the experiment (April 1998 to August 2002). With the exception of the "double distilled water (DDH_2O) with sand" (diamond) which dropped to a low pH value of 2.9, the control pH values in the samples which received no EDO (upper graph in Fig. 2) ranged between pH 6 and 7.

When EDO was added in 2001 (lower graph in Fig. 2) to some of the replicate control OSZW, the pH values decreased from the original range to values below 5, then increased shortly thereafter to the original pH value range except for the "double distilled water (DDH_2O) with sand" control, which remained around pH 5. It is possible that the EDO addition resulted not only in the release of organic acids, but, in addition (as noted in the samples without EDO addition) promoted the release of inorganic acid, which was buffered in the presence of EDO.

Table 2 presents control values for all parameters as monitored on Oct. 29, 2001, (Day 1187) and Apr. 15, 2002, (Day 1355) when SZW water and OSZW water were collected simultaneously. The upper section of Table 2 presents pH and E_H, conductivity and acidity values for both, the control SZW and OSZW for no EDO additions. In this case, OSZW values remain similar to the SZW values for all parameters and sampling dates. When EDO was added, (middle section of Table 2) differences between the OSZW and SZW values are noted. Generally, pH values in SZW are lower and acidity values are higher when compared to OSZW as the organic acids from the decomposition are likely adhering to the sand particulates. pH values of the distilled water and Key Lake water without sand generally increase slightly over time (lower section of Table 2).

After 1187 days, E_H values of OSZW and SZW samples with no EDO range from 323 mV to 501 mV; in the samples that did receive EDO however, the range is larger, from 153 mV to 462 mV. On day 1355, E_H values of OSZW and SZW in the Samples with no EDO range from 293 mV to 606 mV, showing a spread similar to the earlier date. For the controls with EDO, however, the initial low values are no longer present and E_H values fall within the range of 322 mV to 431 mV, similar to the values of the samples with no EDO added. The samples, holding either distilled water or Key Lake water without sand, exhibit E_H values comparable to those measured in samples with EDO and sand. On both dates, the electrical conductivity values of OSZW and SZW in samples with no-EDO range from 70 µS/cm to 115 µS/cm and are generally lower than in the

EDO-added samples, ranging from 150 µS/cm to 231 µS/cm. The SZW values are in several cases slightly higher in both groups of controls than the OSZW values, again likely due to adherence of dissolved substances to solid particles. The values of the control waters without sand range from 154 µS/cm to 169 µS/cm and fall within the range of the EDO-added water for both dates, ranging from 147 µS/cm to 231 µS/cm. The addition of EDO usually - but not always - increases acidity. Differences in acidities at these low values are the equivalent of 3 to 4 drops of 0.01 N NaOH titrant. However, this parameter indicates in some cases that organic acids are released and serve as microbial nutrients.

Table 3 shows Ni and Fe concentrations in the OSZW controls, covering the period from August 1998 to September 2001 (before the addition of EDO), and concentrations at the end of the experiment (August, 2002). It is interesting to note that the OSZW Ni concentration of 0.018 mg/l in background sample "DDH2O + Sand #3" increased to 0.042 mg/L between September, 2001 and the end of the experiment. in August, 2002. In contrast, the remaining two samples (DDH20 + Sand#1and#2) showed lower Ni concentrations after EDO addition within the same period of time.

The following mass balance calculations of the EDO addition allow some interesting observations and conclusions.

Two grams of EDO with Ni concentrations of 7.3 µg/g EDO would have added a total of 14.6 µg of Ni via the EDO flakes. Over the duration of the experiment, 85 mL of the original 700 mL OSZW were consumed by monitoring and analysis. If all of the Ni, added via the EDO, had been released by decomposition, this release would have increased the Ni concentration in the OSZW by a maximum of 0.027 mg/L. But unexpectedly, only a small fraction of this release was actually observed. The OSZW Ni concentrations in the controls with EDO ranged from 0.006 mg/L to 0.009 mg/L. The important observation is that the EDO additions did not significantly increase Ni concentration.

For iron, the theoretical maximum increase in OSZW concentrations (if all iron would be liberated by decomposition) would be 3.9 mg/L, as the EDO iron concentration of 1.2 mg/g is more than 2 orders of magnitude higher than that of Ni (7.3 ug/g EDO). As shown in Table 3, the Fe in the OSZW did increase by the end of the experiment to levels, ranging from 0.18 mg/L to 0.79 mg/L, but this increase was much less than expected, if all Fe in the EDO would be released.

Several mechanisms could explain the relatively low concentrations of the two metals in the OSZW, other than the natural variability of the concentrations in the EDO material itself. Organic molecules develop due to decay of the EDO. The metals might have been complexed to organic acids, causing them to adhere to the glass walls, the filter(s) or the sand. In the case of control sample DDH2O + Sand #3, which received no EDO, the OSZW appears to have been contaminated since an iron concentration of 1.06 mg/L was noted at the end of the experiment. This is in contrast to the other two controls without EDO addition, where the concentration of iron remained constant throughout the experiment at 0.019 mg/L and 0.005 mg/L. The variability of measured concentrations in the control samples demonstrates the difficulties of defining the water quality parameters at Key Lake within this study.

The measurement variability in the control/blind conditions indicates, that for the evaluation of the soil/ sediment material a simple analytical comparison of the measured parameters would not lead to an appropriate assessment of the relevant E_H/pH changes obtained in the samples where Key Lake water comes into contact with the soil/sediment strata. The range of the monitored parameters, produced by the control conditions, is simply too large. Advanced statistics can be used to address such control conditions on a scientific basis. For this experiment, a "Minimum Covariance Determinant Estimator (MCDE)" was used to define ellipsoid regions, describing the control variability. This approach is explained in the following section.

3.3 Statistical Definition of the Control Background Variability

In order to obtain estimates for the variability in the E_H/pH data, the Minimum Covariance Determinant Estimator (MCDE) model was applied as a robust clustering technique after Rousseeuw and van Driessen (1999). In this context 'robust' refers to the stability against extraneous data. In the case of the mean value, one single extraneous data point will shift the mean of the sample. The degree of robustness is termed 'break-down'. A break-down (BD) of 50% says that even if 50% of the data in a data set are extraneous data, the mean will not be affected. With a BD of 100% even a single extraneous data point will change the location of the mean.

In a given data set, the MCDE can be calculated for different break-down levels. From these data points, a variance-covariance matrix is calculated. Confidence regions are constructed using a classical Chi-square or χ^2 distribution at a confidence level of 95% as significance criterion. The result is given in Fig. 3, where the E_H/pH data of the control samples (see Table 2) are presented. Confidence regions for two break-down levels (at n = 32) are shown. The inner ellipse represents a break-down level of 50%, while the outer ellipse represents a break-down level of 100%. The ellipses indicate a Chi-square distribution at the 95% confidence level enclosing at least 47.5 % (inner ellipse) or at least 95% (outer ellipse) of the measurement data. The change in the break-down level does not shift the position of the ellipses' center significantly. There is no indication that the location of the sample mean is affected by the presence of extraneous data points. Statistically, the data variability, which occurs in the absence of sediments, is defined for the time period of the experiment including the treatment with EDO.

Variability was in this case established via data, measured one month after the EDO addition (day 1187) and via data collected when the samples were taken out of the refrigerator (day 1355), SZW samples were collected at both sampling times and the results were included in the data set (Fig.3). The analysis by MCDE indicates that there is no significant difference between SZW and OSZW in these control samples at the 100 % breakdown level, except a single data point in the pore water observed on October 29th, 2001. Thus the OSZW conditions are the same as the SZW for the controls. The ellipses represent the control variability regions, against which the effects in the samples with soil/sediment can now be compared (Fig. 3).

The reaction of a "water only" and a "water/sand system upon addition of EDO is given in Fig. 4, which presents the E_H/pH values in the control samples as a function of time. Three data sets are shown:

a) The EH/pH pairs before EDO addition of all samples (before October 2001) (blue),
b) the E_H/pH pairs after October 2001 without EDO added (green), and
c) the E_H/pH pairs measured after October 2001 where EDO has been added (yellow).

A comparison of the data points from the three data sets within and outside of the MCDE ellipses (Fig. 4) shows clearly that the samples with added EDO behave differently. While all samples exhibit a slight decrease in E_H over the time, this E_H decrease is larger in the samples after EDO addition. In some samples, the E_H reduction following EDO addition is very large. In contrast, the pH range is only affected to a minor degree.

In order to show the time evolution of the processes following EDO addition, data obtained from the same samples are connected by lines in the sequence of time (always starting in the group of blue data points in Fig. 4). It is apparent that E_H values drop drastically shortly after EDO addition, reach a minimum after a few weeks and then rebound to more oxidizing conditions.. For some samples, the E_H reduction is sufficient to reach very low values corresponding to the reduction of SO_4^{2-} into H_2S/HS^-. It is, therefore, proposed that through the addition of EDO reducing conditions can be achieved. Reducing conditions might lead to the precipitation of Ni, possibly as a nickel sulphide, within the sediments. This desirable potential effect would retain Ni in the sediments via precipitation as a solid

The long-term effect of EDO addition on the Eh/pH values, shown for all controls in Fig. 4, does not differ between 1187 days, before the addition of EDO, and after 1355 days at the end of the experiment (Fig.3). The data in Fig. 4 in contrast, show short-term changes in E_H/pH values induced by the EDO addition. At the end of the experiment (Fig 3) the organics have completely decomposed. The EDO is utilized by the microbes as an energy source, converted essentially into CO_2 and water. The E_H/pH values , measured shortly after EDO addition, produce a statistically significant decrease in E_H and a moderate reduction in pH (Fig, 4) E_H/pH data from samples without EDO are found mainly inside the area between the inner and the outer variability ellipse reflecting a higher variability or 50% extraneous values for both SZW and OSZW controls.

In summary, the control ellipses or the breakdown confidence levels, generated by statistical interpretation, can now be utilized in all subsequent E_H/pH evaluations of the Key Lake water in contact with the soil/sediment strata. Data points, lying distinctly outside these ellipses, indicate conditions, significantly different from that of the controls or blinds, resulting from E_H/pH alterations due to :

a) the presence of the lake bottom material and/ or
b) the addition of EDO.

The E_H/pH regime values which fall inside the ellipsoids are due to the measurements variability as defined by the control/blind samples or in practical terms, they are the standard deviation which is not expressed as a linear "plus minus" relationship, but form elliptical regions.

3.4 Monitoring of Overlaying Saturated Zone Water (OSZW on top of soil/sediment) and Saturated Zone Water (SZW)

As outlined in the report "Surface Water Quality Projections for Key Lake Mining Operations", Boojum Research, 1999, many of the substrates, sampled to a depth of one meter below the dried out lake bottom, were not expected to release significant quantities of Ni during the ground/surface water recovery. The highly variable physical and bio-geochemical characteristics of the drained lake bottoms, described in detail in the first assessment, lead to the conclusion, that the focus of the second set of experiments was the generation of data, which will facilitate statements about the potential Ni and Fe mobility under long term saturated conditions and a description of the revitalization effects on some sediments with the addition of EDO.

3.4.1 Introduction and Grouping of Samples

As the OSZW and SZW of soil/sediment samples, described in the 1999 Boojum report, showed differences in initial pH value during leaching, the long term monitoring data, obtained within this follow-up study, were also grouped according to pH level. Two groups were formed, consisting of 27 samples in which the pH values of the OSZW was <5 at the time of set up in August, 1998 and 66 were > 5 (Table 4a). That distinction was made on the assumption that low pH would promote metal mobility. The data could have been grouped according to several other criteria, e.g. according to their initial Ni and Fe content, their clay or organic matter content or utilizing their initial conductivity values (reflecting the presence of highly mobile solutes).

3.4.2 Summary of Long-term E_H/pH Evolution

Of the 93 OSZW samples, used in the experiment, 8 received no EDO, 47 received two grams of EDO in 2001 and 38 samples received five grams of EDO in 2002, when the experiment was moved to room temperature (Table 4a). These samples were subdivided with respect to the measurements obtained at 7°C, and those measurements in the same samples at 22 °C, reflecting seasonal temperatures in the field. In the middle and lower table, the first two columns compare the range of values at 7 °C in the refrigerator in the upper part of the table where no EDO was added, before and after the addition of EDO. The third column contains the values obtained at room temperature of 22ºC. The first row (N-samples) presents, the number of samples and the second row (N-tested), shows the number of measurements made over the course of the experiment. The next three rows contain lowest and highest pH values along with the average pH reported for each group.

In the samples without EDO addition, the average pH values range from 5.02 to 6.06 (upper part of Table 4a). . When the water was below pH 5 it appears as if the warmer temperature produced a slight increase in the range of pH values but not in those samples which had a higher pH at the start of the experiment.

The average pH values of the samples which received EDO were lower than those that did not. The minimum, maximum and average pH values show generally only a slight change (up or down) after EDO addition Differences between the temperature regimes are not evident. Time trends in pH with EDO addition will be discussed in section 3.4.3.

Table 4b presents E_H values of the OSZW organized in the same manner as Table 4a. The minimum E_H values for the group, to which no EDO was added, are -4 mV and -98 mV, likely a result of the decomposition of organic matter. The maximum values, are +293 mV and 771 mV, suggesting highly oxidizing conditions. However, the average E_H values between 213 mV and 429 mV, are in the range of normal surface water.

The group of OSZW, which received 2 g of EDO, generally reports lower minimum values (the lowest value is – 475 mV) but some higher minimum values (up to 409 mV) as well, when compared to QSZW without EDO treatment. This reflects the large variability of the substrates, containing solutes which lead to oxidizing conditions in the saturated zones. A maximum E_H value of 954 mV is noted, probably due to an erroneous reading. The average E_H values are higher at cooler temperatures and before the addition of EDO in both the pH < 5 and pH > 5 sample groups (551 and 581 mV). The average E_H values decrease with time in the refrigerator (at 7 °C) to between 271 mV and 254 mV and subsequently at room temperature (at 22 °C) for both pH groups to between 201 and 181 mV. The three minimum E_H values (-475 mV, -360 mV and –16 mV) for both pH groups were recorded after the addition of EDO. Average and minimum E_H values in both pH groups suggest that EDO reduces oxidizing conditions.

OSZW samples, which received 5 g EDO, show exclusively positive E_H values in both pH groups in the refrigerator. However, when the OSZW samples were brought to room temperature, negative E_H values were measured in both pH groups (minimum – 170 mV and –176 mV). The maximum E_H value of 1196 mV, as discovered later, was due to a malfunction of the probe.

This initial assessment of the pH and E_H values in the OSZW samples suggests that the addition of EDO results frequently in a reduction of oxidizing conditions as would be expected from the gradual onset of microbial decomposition. These reactions occur regardless of the original pH of the OSZW or the amount of EDO added In selected zones, the addition of EDO has therefore the desired effect on the saturated material, leading to reduction of the oxidizing conditions in the saturated strata, and likely reducing the release of Ni. ..

3.4.3 pH Fluctuations with Time

Figures 5a to 5c show pH values in the OSZW over the entire monitoring period from 1998 to 2002 for selected individual samples (top graph) and for all samples in the three groups without and with 2 g or 5 g of EDO. In the lower graph were all values are presented the individual time trends are difficult to note, as the values overlap. The detailed data for each sample location/depth are given in Appendix 1- Table 8. The upper graph of each group presents pH values for selected individual OZSW soil/sediment samples to showcase the range of time trends which develop during saturation at different locations and depths.

In the first group (OSZW without EDO addition), an undisturbed (not desiccated) sediment sample is included from a small residual pond in the north portion of Hourglass Lake (HG North Small Pond). This sample shows under experimental conditions an immediate increase in pH in contrast to a drained lake bottom sample (HG-T1-032-71, located along transect 1 (T1), sampled at a depth of 32 to 71 cm).

The undisturbed sediment was not exposed to oxidizing conditions due to the dewatering activities at Key Lake. The sediment material contained 10 % organics and 6 % iron. It appears that with the addition of Key Lake water, the sample consumed oxygen very quickly in the beginning of the experiment, while iron reduction increased the pH of the OSZW from 6 to > 7. On the other hand, the OSZW of the drained lake bottom sample with a much lower content of organics and iron (2 % and 0.04 % respectively) shows a quick decrease in pH due to release of hydrogen ions produced due to oxidation. Subsequently, both samples maintain their pH values after the initial changes throughout the monitoring period. The combined pH evolution in the OSZW of the sample group with no EDO addition as shown in the lower graph of Fig.5a indicates that these two trends reflect the general variation over time, covering the upper and the lower boundary of pH changes.

The upper graph in Fig. 5b presents pH time trends for OSZW before and after EDO addition (2 g) from four samples containing material collected from a test pit at Lower Seahorse Lake (LSHT3-34, located along transect 3, location 34 m; (see Map1 of Boojum's Report, 1999). The pit was excavated to about half a meter, which allowed the collection of materials from 4, visually distinguished strata at depths of 0 to 10 cm, 10 to 22 cm , 22 to 32 cm and 32-44 cm (pit bottom). All four samples show the same pH evolution. Over the first 3 years of the experiment, the OSZW of three of the samples remain at pH values of about 4 or lower, while the pH value in the OSZW of the fourth sample drop in the first year from approximately 5 to 4. In year 3 (2001), the pH values of all the samples increase with the addition of EDO from 4 to >7 within a few months. LOI and iron values of these samples are, from top to bottom of the sampling profile, 16 % (moss /lichens) and 6.6 %, 2 % and 0.3 %, 7 % and 1.2 % and 1 % and 0.7 % respectively.

The lower graph of Fig. 5b presents the pH data for the OSZW of all samples that received 2 g of EDO. As summarized in Table 4a, the pH values for this group before EDO addition range from approximately 3 to 7. The responses to the EDO addition over time are multifold and highly variable. The strong upward trend after EDO addition to the selected samples, showcased in the upper graph, is not consistent but frequent..

The upper graph in Fig. 5c depicts the pH response to re-saturation in the OSZW of four Hourglass samples (HG-T2-25, located along transect 2 (T2), sampled at depths of 0 to 4 cm, 10 to 48 cm, 48 to 57 cm and 65 to 71 cm). The pH value in the OSZW of the deepest sample (HG-T2, 65 to 71 cm) drops on re-saturation from 3.5 to 3. However, the response of the other three samples, located above the deepest stratum, is very different. In two samples (HG-T2, 10 to 48 cm and HG-T2, 48 to 57 cm), the pH values in the OSZW quickly increase from initial values between approximately 5.5 and 6 to >6, where they remain for about 3 years prior to the addition of EDO. After the addition of 5 g EDO in September, 2001, pH values decline to a range of about 4 to 5 and rebound to about 6 within a few months (Fig. 5c). The surface sample (HG-T2, 0 to 4 cm) contains moss and lichens on the surface, which provides some initial in situ EDO in l998. This organic matter may lead to the increase in pH values in the OSZW from about 5.5 to 6.5 and sustains these levels during the following years. A few months prior to the EDO addition of 5 g by July, 2002, a pH value >7 is measured in the OSZW. This suggests that in some samples, where live vegetation is being flooded, in-situ EDO contributes to maintenance of circum-neutral pH values.

The pH evolution of the OSZW in all samples, presented in the lower graph of Fig. 5c, appears visually different when compared to the large group of 2 g EDO additions (Fig. 5b). This impression is created by the fact that at the beginning of the experiment only 5 of the 38 samples in this group fell into the low-pH <5 category (Table 4a). Comparing the upper graphs of the individual sample trends of Fig. 5b and 5c, the samples with 5 g EDO additions show a much sharper increase of pH values in the OSZW when compared to the samples with 2 g EDO additions. This is caused by the fact that the samples with the 5 g EDO treatment were removed from the refrigerator soon after the EDO addition and the higher temperature increased the rate of microbial degradation. At lower temperatures, the degradation started more gradually. The fact that at room temperature more often measurements were made explains the density of the measurements at the end of the experiment..

3.4.4 Causes of pH/E_H Fluctuations with Time

The long-term monitoring confirmed gradual changes in the saturated zone water and showed that with addition of easily degradable organic matter microbial activities are taking place. If inorganic acids are released from the soil /sediments , the drop in pH values was immediate and rapid and at times extensive. In contrast, the release of organic acids leads to a gradual decrease in pH value followed by it's recovery due to the decomposition of these organic compounds by the microbes, as shown in some of the selected individual "showcases".

The gradual release of the organic acids matter can also originate from vegetation, previously growing on the dewatered sediment, or from decomposed organic materials, buried by layers of sand. If the organic content of the stratum is degradable, then microbial activity is supported. Once organic compounds are released decomposition starts, oxygen is consumed, leading to the lowering of E_H values, as illustrated by the additions of EDO. Once the E_H is negative, oxidized iron in the OSZW is reduced by microbes leading and this reaction leads to increases in pH.

During the initial phase of the experiment the samples were maintained at low temperatures of about 7^{o}C (reflecting field conditions) and at relatively low levels of oxygen (nitrogen in the headspace simulating subsurface). It was not known at which time decomposition would start, but it was not expected to be rapid. The organic content in the soil/sediment samples was quantified by Loss On Ignition (LOI). This determination however, does not distinguish between easily degradable organic matter, which is relevant to the microbiological activity, and organic matter which is less degradable such as cellulose, lignin or humic substances, which would only slowly, if at all, degrade and therefore not contribute to changes in the saturated zone.

The LOI content in the soil/ sediment samples within each of the treatment groups is large. The group to which no EDO was added, contained 0.1 to 48 % of L.O.I. The group, which received 2 g of EDO, contained originally 0.1 to 19 % L.O.I. and the group of samples, to which 5 g of EDO was added, contained 0.1 to 66 % L.O.I. Thus in all groups, easily degradable organics could have been released from the in-situ organics as the material was saturated .

The observation period prior to the addition of the EDO was very long, as the objective was to detect gradual and long term changes.. Therefore, the addition of EDO was carried out after a long initial monitoring period, towards the end of the experiment.(Table 1a) . EDO addition in the form of potato flakes (from French fry factories) was previously tested in several AMD projects, i.e. in waters with high acidity and metal content, where the stimulated microbial activity resulted in the generation of alkalinity (Kalin and Chaves, 2003) . Potato flakes, moreover, have the useful characteristic of settling to the bottom within a water column. Due to their complete degradability to CO_2

and H_2O, carbon, this material has no effect on the water quality, and contains traces of nitrogen and phosphorus in organic form, suitable for consumption by microbes.

3.4.5 The Effects of the EDO Additions

The most important change, occurring in lake bottom sediments during the re-flooding of a lake, is the transition from an oxygenated to a low-oxygen environment. These changes (high oxygen to low oxygen) are frequently influenced by EDO, which can be present within the sediment and the strata below, or can be induced by additions of EDO. The addition of EDO can lead to the retention and precipitation of contaminants in the sediments, thus improving water quality in the lakes. This section addresses the induction of reducing conditions through EDO addition.

Figure 6a shows the Eh/pH relationships of the OSZW, derived from the sample before the addition of 2 g EDO and 4 weeks after EDO addition. Although Eh values of the OSZW are depressed in a large number of samples, following the addition of EDO, the pH values are only moderately affected. Some OSZW samples show a significant drop in Eh values, almost into the region of sulfate reduction (indicated by the dashed line, annotated "SO^{2-}_4/H_2S^-"). EDO is clearly the cause of this E_H reduction and the results are, for all practical purposes, not statistically different from those noted in the control samples, shown in Fig.4. The Eh/pH values in the OSZW of many samples remain within the elliptical confidence control regions but a large number show the same response as was noted before, which would indicate that the response of the EDO addition in the presence of soil/ sediment material does not differ from the response in controls. The effect of the EDO addition is the same, both in distilled water and in water were solutes are released and higher oxidizing conditions prevail. Thus, strategic addition of EDO to soil/sediment material in the re-flooded lakes will likely also lead to the induction of reducing conditions.

With time, the Eh depressions disappear as shown in Fig. 6b but are maintained for at least 2 weeks . Six months after EDO additions and just before the samples were removed from the refrigerator, all E_H /pH values of the OSZW and SWZ were back in the range of control variations. The difference of the effects of the E_H shift, based on the addition of either 2 or 5 g of EDO, alters the confidence intervals, but not the overall desired effect.

Fig. 7 presents OSZW data for 18 randomly selected samples, which received 5 grams of EDO at room temperature. As the time intervals were more frequent, a more accurate understanding can be obtained on the length of time the EDO maintains reducing conditions. Clearly in some samples, the reducing environment is maintained for 2 months. The same trend as noted above is evident; - generally high E_H values prior to EDO addition (reflecting oxidizing conditions) and a major depression in E_H values over 2 months The subsequent return of the depressed E_H values to the values before the EDO addition is shown in Fig.7 via "timelines" for individual samples. These lines can be followed over 4 months, moving from the blue area in the graph to the yellow region and back into the region of the control variability. These lines show, that the Eh depression occurs rapidly and can result in very low values, where sulphate reducing microbial activity can be expected. . The detailed data are given for the entire set of measurements in Appendix 1, Table 8.

Fig. 8 shows a comparison of E_H/pH data, obtained from OSZW and SZW samples with 2 g of EDO addition at the end of the experiment to controls without and with 2 g EDO addition. The OSZW conditions and those inside the sediment are the same as the EDO is clearly affecting both the sediment and the overlaying water. This is an essential component for potential practical applications of adding EDO in the field to reduce nickel release from the sediments.

3.4.6 E_H/pH and Ni Release/Removal

The association between a regime of high pH and low E_H in the sediment and low Ni concentrations in the OSZW and SZW would be evidence that these conditions could effectively mitigate the potential release of Ni from the re-saturation of oxidized lake bottom sediments.

Figure 9 explores this association, using a three dimensional representation of Ni concentrations in the OSZW and related E_H/pH parameters. The yellow circles represent the Ni data. A small number of the Ni data points fall outside the 95 % confidence ellipse, close to the sulphate reduction region (line annotated "'SO_4^{2-}/H_2S"'). The Ni concentrations are additionally coded by the color of the z-symbols. The color map progresses from yellow (low Ni concentration) to green (medium Ni concentration) and red (high Ni concentration). At E_H values below the red line, passing through the 95% confidence ellipse in the E_H/pH (xy) plane, no green or yellow symbols are found. The single red-symbol Ni concentration is associated with high E_H and low pH. The data indicate that relatively high Ni concentrations are exclusively associated with higher E_H values in the lower pH regions. Conversely, negative E_H values (reductive conditions) and circum-neutral pH values favor low Ni concentrations, indirectly confirming the original premise on which the EDO additions were made.

A summary of the Ni evolution (release or removal) in the OSZW is provided. in Table 5.. The table shows the number of samples, for which Ni concentrations in the OSZW were measured in August 1998, at the beginning of the experiment, and in August 2002, when the experiment ended. Detailed data are found in Appendix 1 in the corresponding Table. This assessment disregards changes, which occurred during the EDO addition, and thus does not account for reductions during the E_H /pH depression as, of course, some additional Ni release or removal may continue over time when the microbial activity ceases.

Table 5 presents differences in the total mass of Ni and Fe released or removed saturated solid material in the samples over the test period. The experimental set up contained on average 250 g of wet solid material to which 700 ml of Key Lake water was added. The release or reduction of Ni and Fe was calculated, based on concentration/mass in the OSZW and not on the amount per g of sample, as the surface area, density and moisture content of the saturated solid material are all factors which influence release/ removal of Ni. The mass of Ni and Fe in the OSZW was adjusted for the sample volume removed over the course of the experiment, and for the amount of Ni or Fe added through the EDO, based on the concentrations determined in the control samples (Table3). Table 5 represents therefore the mass of Ni and Fe in the OSZW at the end of the experiment which was subtracted from the mass present at the start. Thus a negative number represents the mass of Ni or Fe removed, while a positive value indicates ~~d~~ that a greater mass was found in the OSZW at the end of the experiment than at the beginning. The table includes the mean value of the mass differences in each group along with minimum values, the largest amount removed and maximum value the largest amount released from the saturated soil sediment material.

Four of the 7 samples without EDO addition show negative values; the average Ni mass, removed from the OSZW of those samples, is – 32 ug . The largest Ni mass, eliminated from the OSZW is -155 ug and the largest Ni mass added to the OSZW is 35ug.. Of the 46 samples with 2 g of EDO addition, 43 samples show a reduction of the original Ni mass in the OSZW: the average reduction is -145 ug ; the largest reduction in the OSZW is -976 and the largest increase in the OSZW is 2.0 ug . Of the 37 samples with 5 g of EDO addition, 24 show a reduction of the Ni mass in the OSZW with an mean of -16 ug. The largest reduction in the OSZW is -122 ug and the largest increase in the OSZW is 3 ug . The effect of the EDO addition is more pronounced in this assessment, as the remaining sample volume is smaller, due to the higher frequency of monitoring.

In conclusion, some lake bottom locations are releasing Ni but for the majority of the samples the Ni release is small and reductions occur in about 50 % of the samples naturally. The addition of EDO induces (as expected from the changes in E_H/pH discussed previously) a major reduction of Ni-release in the OSWZ as well as in the SZW or the pore-water of the saturated material. The fact that in the absence of EDO 50 % of the samples produced negative values is likely a reflection of the small sample size. In Table 6 summarizes the absolute values of the mass of Ni in the OSWZ, reflecting the amount released from about 250 g of wet sample material. Table 6 shows the amounts of Ni and Fe in the OSZW before the addition of EDO (1998 – Sept. 2001) and after the addition of EDO until the end of the experiment in August 2002. From a total of 39 measurements, the mean and median values are 16.9 or 5.7 ug respectively per sample. Considering all test results, the mass of Ni released is low and the statistics indicate that Ni release occurs only in isolated locations.

3.4.7 Iron Release from the Saturated Material

Table 5 also summarizes the differences in the total mass of Fe released or removed from the saturated solid material over the test period. It is evident that the re-saturation of the soil/sediment strata results in an increase of iron in the OSZW, as the number of absolute negative values, representing removal of iron, are much smaller than for the Ni mass. Iron is removed from the OSZW in only 11 out of the 87 samples tested. The natural sediment, i.e. the sample not desiccated produced the only negative value in the group were no EDO was added.

Table 6 summarizes the mass of Fe in the OSZW. Some values, released from the 250 g of wet solid material tested, are in the mg range. It is not surprising that the addition of EDO influences iron mobilization. Depending on the E_H /pH regime , iron will either be reduced from its oxidized state or cycled back to its oxidized state after reduction. Both conversions are microbiologically mediated reactions, where the carbon either serves as an electron donor or acceptor. This in turn affects the precipitation of Fe as a hydroxide, as oxidized iron precipitates at lower pH and reduced Fe at higher pH (both as iron hydroxide). In all of the samples iron precipitates were noted as the experiment progressed with time. During precipitate formation, Ni can be adsorbed to the hydroxide and during dissolution it might be released.

Figure 10 shows the E_H/pH data of the OSZW for the 37 samples before and after the 5 g EDO additions. Essentially all the iron is present as Fe (III) in the oxidized state before the addition of 5 g EDO gray circles)., As the iron reducing bacteria become active after EDO addition, the pH rises with time. , The reduced iron precipitates or forms a hydroxide precipitate, which is a combination of both iron oxidation states. Oxidation of Fe (II) may result in a somewhat reduced pH of the overlaying lake water with subsequent precipitation of $Fe(OH)_3$/FeOOH/Fe_2O_3, which would adsorb Ni on their surfaces.

The effect of iron oxidation/reduction on pH changes was demonstrated with the ASZW, where amendments were made, both of EDO and rust powder. The amendments were made to beakers, containing the same soil/ sediment strata, previously used in the 1999 stirred leaching experiment. The soil/sediment samples were sorted into groups with "high" iron content (1.5% to 22%) as shown in Fig. 11a and with "low" iron content (less than 1.5%) as shown in Fig. 11b. Natural zero valent iron in the form of rust powder obtained from rusty concrete reinforcing bars was added to the saturated soil/sediments to increase the iron content in all samples to at least 2% as some samples had very low iron content.

The intention of this experiment was to demonstrate that in the presence of only a small amount of oxidized iron , the addition of rust powder would stimulate the microbial population in the saturated soil/ sediment strata to reduce iron and thereby produce an increase in pH. With the first addition of EDO, the microbial populations were assimilated, and a slight increase in pH was noted for some samples. The second addition of EDO along with the rust powder produced a more rapid increase in pH (some pH values were higher than 7. 5). Both the high and low iron soil/sediment strata displayed the same overall pattern of pH increase.

3.5 Diffusion Assessment of Ni from Combined Saturated Strata in the Columns

As stated in the introduction, although individual strata may release or remove Ni, the combined effect of their interaction with the recovering lake water is difficult to assess. Hence, 8 test columns were monitored, to determine the combined effect of Ni release from the soil/sediment material to the distilled water overlaying the solids. This process was assumed to be mainly based on diffusion. The monitoring frequency is summarized in Table 1b and detailed activities are listed in App1- Table 1.

A mass balance of the Ni released from the columns is presented in Table 7 for each column. The detailed data are given in Appendix 1-4 for Ni balance, the type of soil/sediment strata and their position in the column. The percentage Ni released to the distilled water which was replaced top water defined in this report as Diffusion Product Water - DPW) was calculated, based on the total mass of Ni present in the solid material in the column, determined after the column was dismantled. The total Ni released from the soil/sediment material was in a range between 0.06% or 0.17 mg to 3.6% or 3 mg. The highest percentage of Ni mass was released from the solids with the second lowest Ni content, and the lowest percentage of Ni mass was released from the solids with the fourth highest content of Ni, indicating a non-linear relationship between Ni solid concentrations in the dewatered lake bottom material and Ni release.

In summary, under actual field conditions, a small amount of Ni, present in the soil/sediment strata, will likely diffuse to the surface water in most of the locations, represented by the columns.

Finally, it is important to determine if indeed the E_H/pH conditions, which were observed in the experiment within the saturated zone samples, reflect the behavior of the substrata as monitored in the columns. The DPW data were used for this assessment. Should decomposition take place in the surface and subsurface strata, the E_H/pH conditions should be similar to those of the saturated soil/sediment experiment.

The E_H /pH data pairs, shown in Figure 12, suggest that both microbial iron reduction and sulfate reduction can take place after saturation, utilizing the interpretative values of the natural region of microbial activity (see Fig. 1). In summary, the static saturation experiments reflect the conditions, encountered in the columns. Similar effects are therefore also likely to occur in the recovering lakes during rebound of the ground water table.

4.0 Conclusions

- The control experiments, although reflecting variability, indicate that addition of EDO can stimulate microbial activity in the re-flooded sediments. This activity would create a barrier between the lake surface water and the saturated subsurface therefore reducing Ni release to the water column.
- While nearly all soil/sediment materials release iron, the release of Ni is small in many of the locations tested. Potential sources of major Ni release are highly localized and could be mitigated via EDO addition, if needed.
- The addition of EDO to the sediments in the recovering lakes should generally result in a decrease of Ni mass, released to the lake water (more than 90 % of all samples, to which 2 g of EDO was added, showed reductions in Ni-mass, released to the Overlying Saturated Zone Water). Iron is generally expected to increase in the lake water due to re-flooding of the lake sediments.
- Variations in Ni and Fe release from individual strata are extremely large, however the total Ni and Fe mass released to the OSZW per g of soil sediment material is small.
- The core column experiment identified some lake bottom zones with a potentially elevated (diffusive) Ni release, where EDO field tests could be carried out. Localized zones with a relatively high Ni diffusion potential are found in Hourglass Lake and Lower Seahorse Lake.

5.0 References

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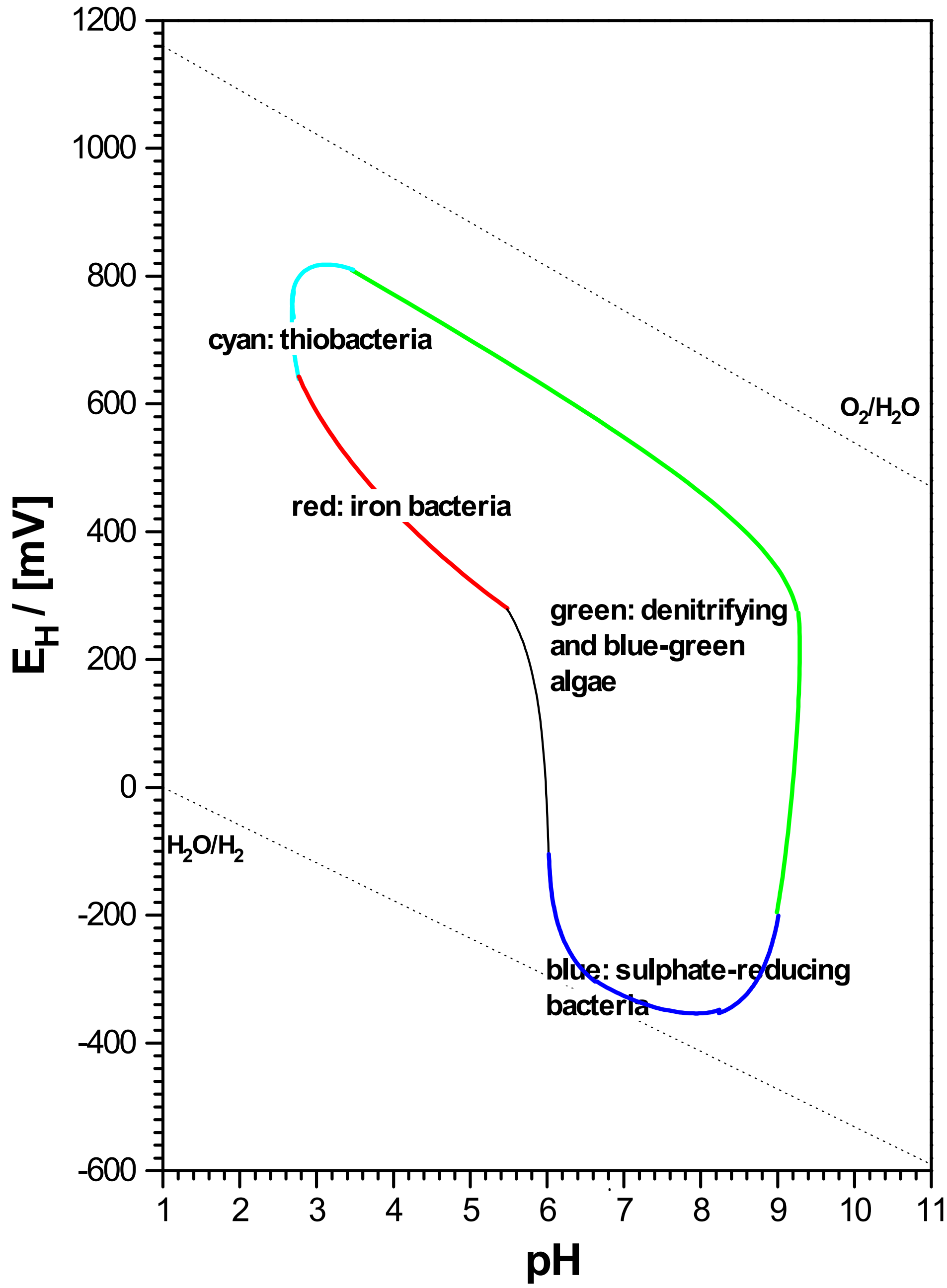
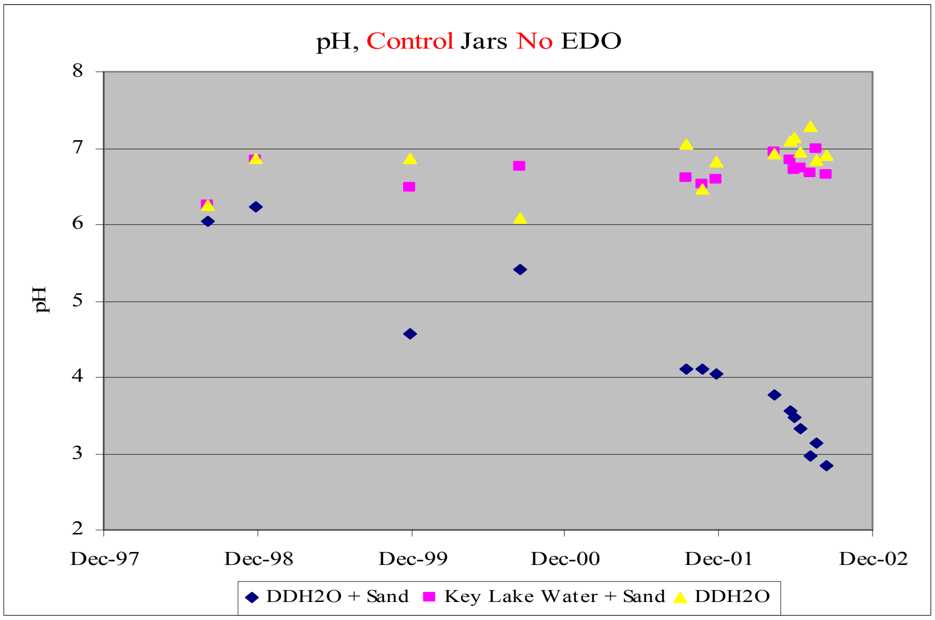


Figure 1: E_H/pH diagram giving the stability limits of water against oxidation (top dashed line) and reduction (bottom dashed line). The boomerang-shaped field encloses the limits of natural aqueous environments which coincide with the stability limits of bio-geo-chemically important microbial systems.



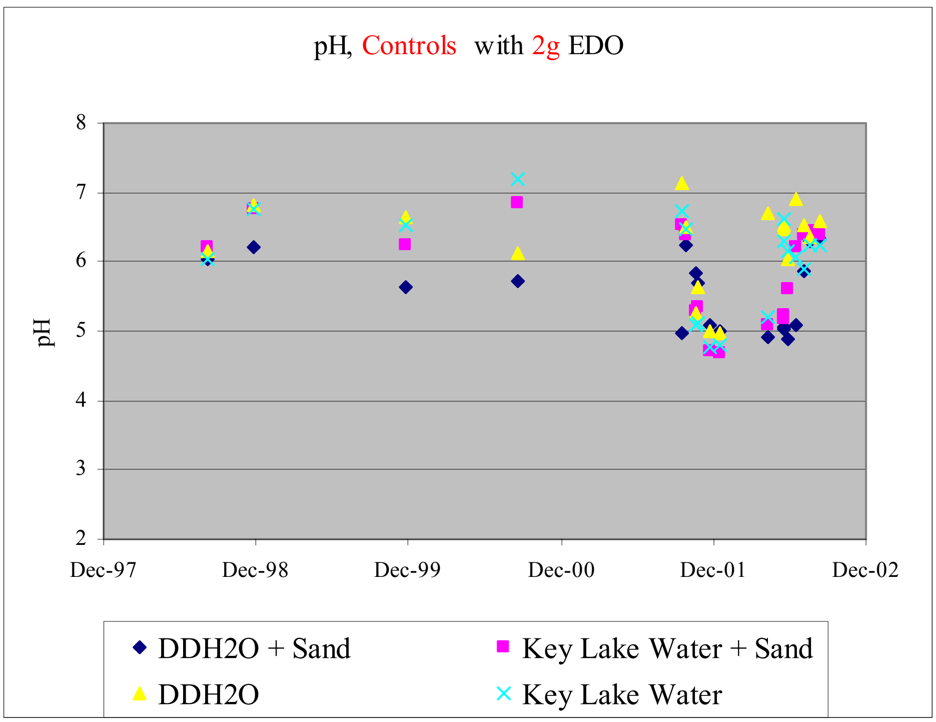


Figure 2: Control blind samples

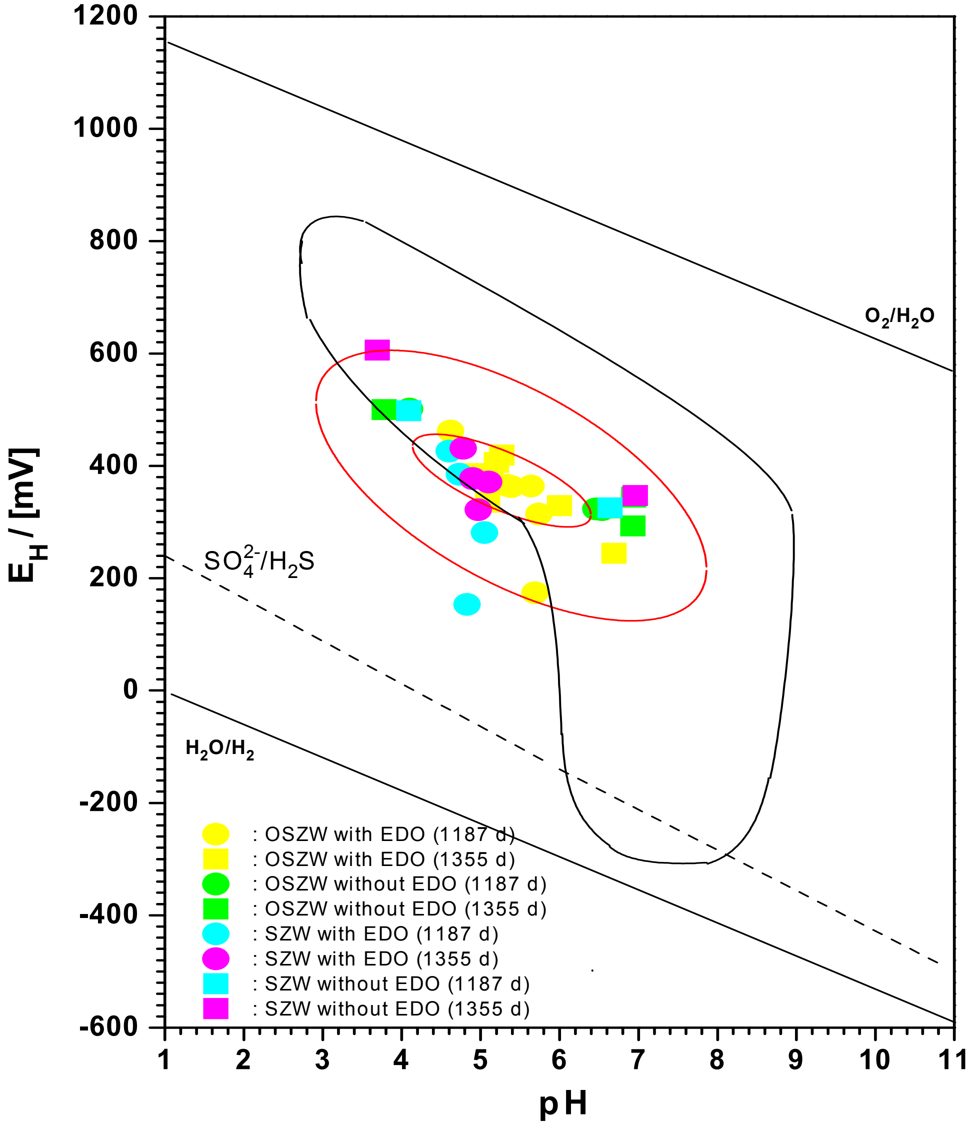


Figure 3: OSZW and SZW Control Samples: E_H/pH after 1187 days and 1355 days. The confidence regions (50 % break-down for inner ellipse and 100 % break-down for outer ellipse) for day 1187 (Oct. 29, 01) and day 1355 (Apr. 15, 02) represent the normal parameter variability in waters, not affected by EDO treatment. The robust statistical approach (Minimum Covariance Determinant Estimator with χ^2 confidence regions) is less sensitive towards extraneous data and allows a subsequent assessment of the sensitivity of specific SZW and OSZW combinations to organic treatment.

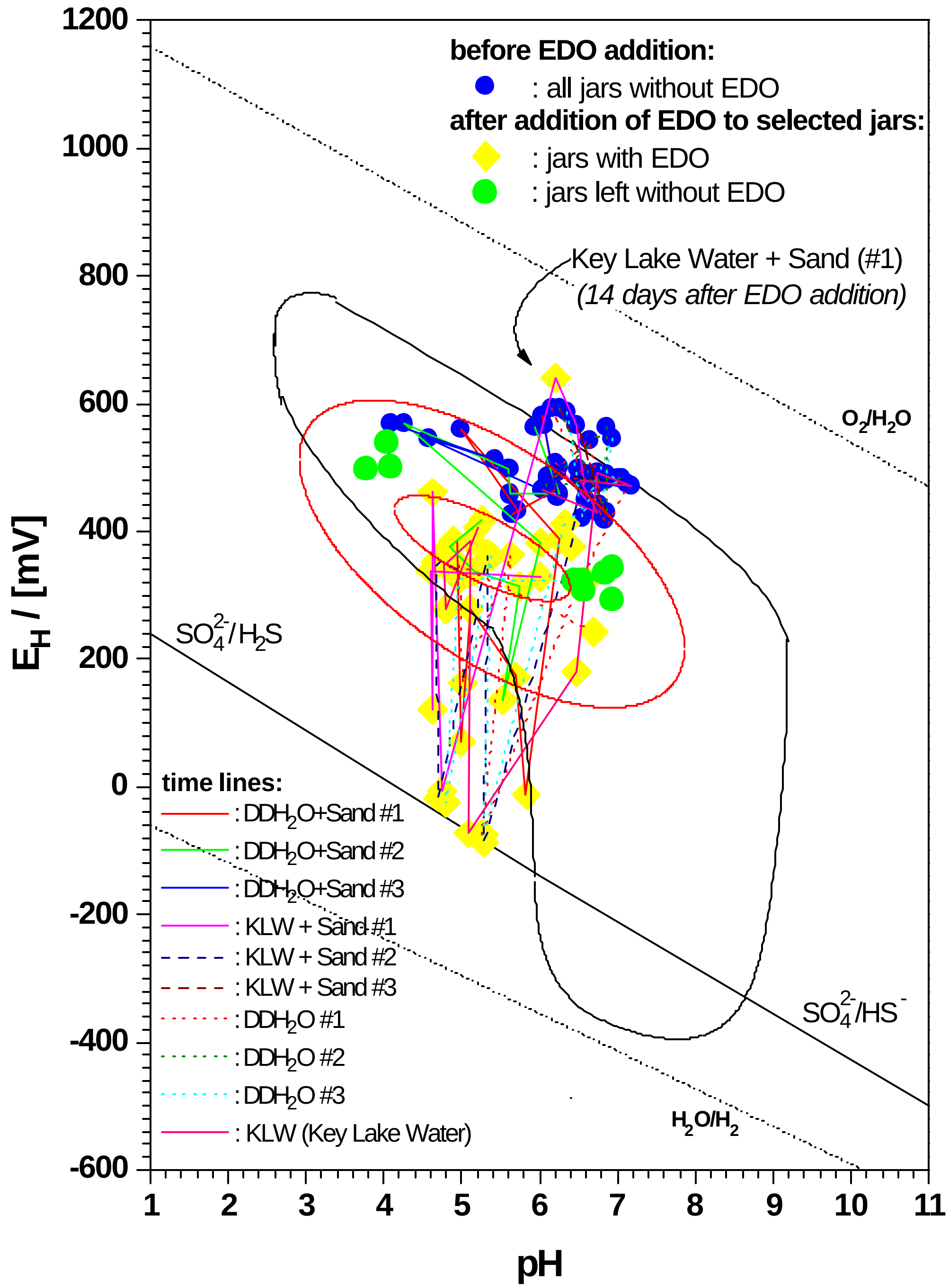
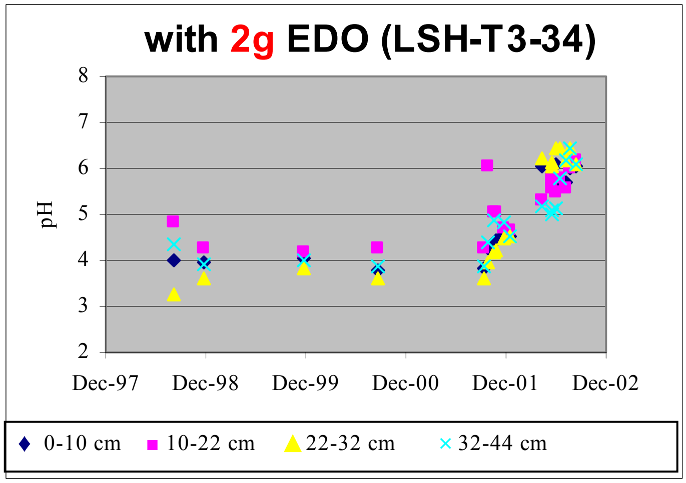


Figure 4: OSZW data of all controls as presented in Figure 2, however now defining the statistically significant deviation from the initial additions of EDO, which was notable after the EDO additions. Lines connect data for the same sample in time-sequence.



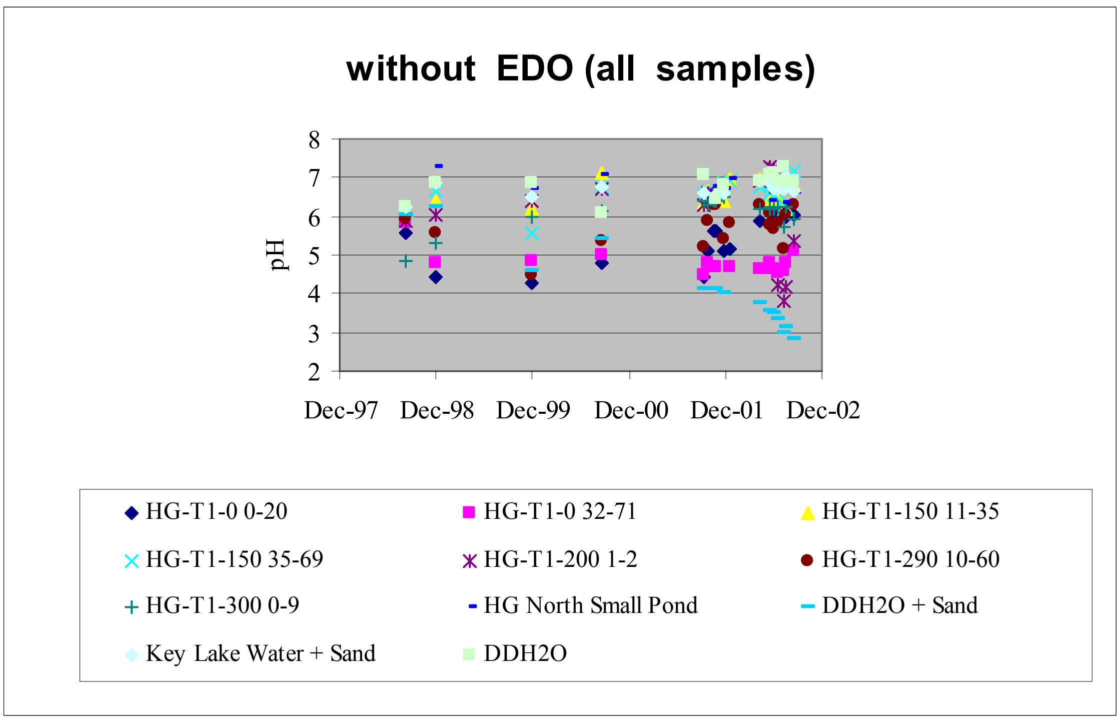
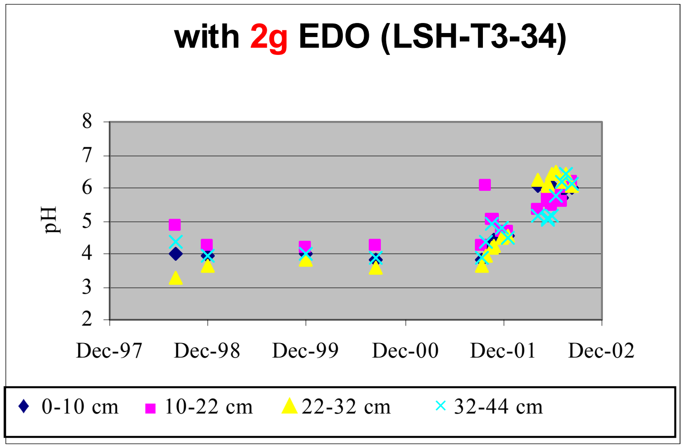


Figure 5a: pH of OSZW with Sediment no EDO



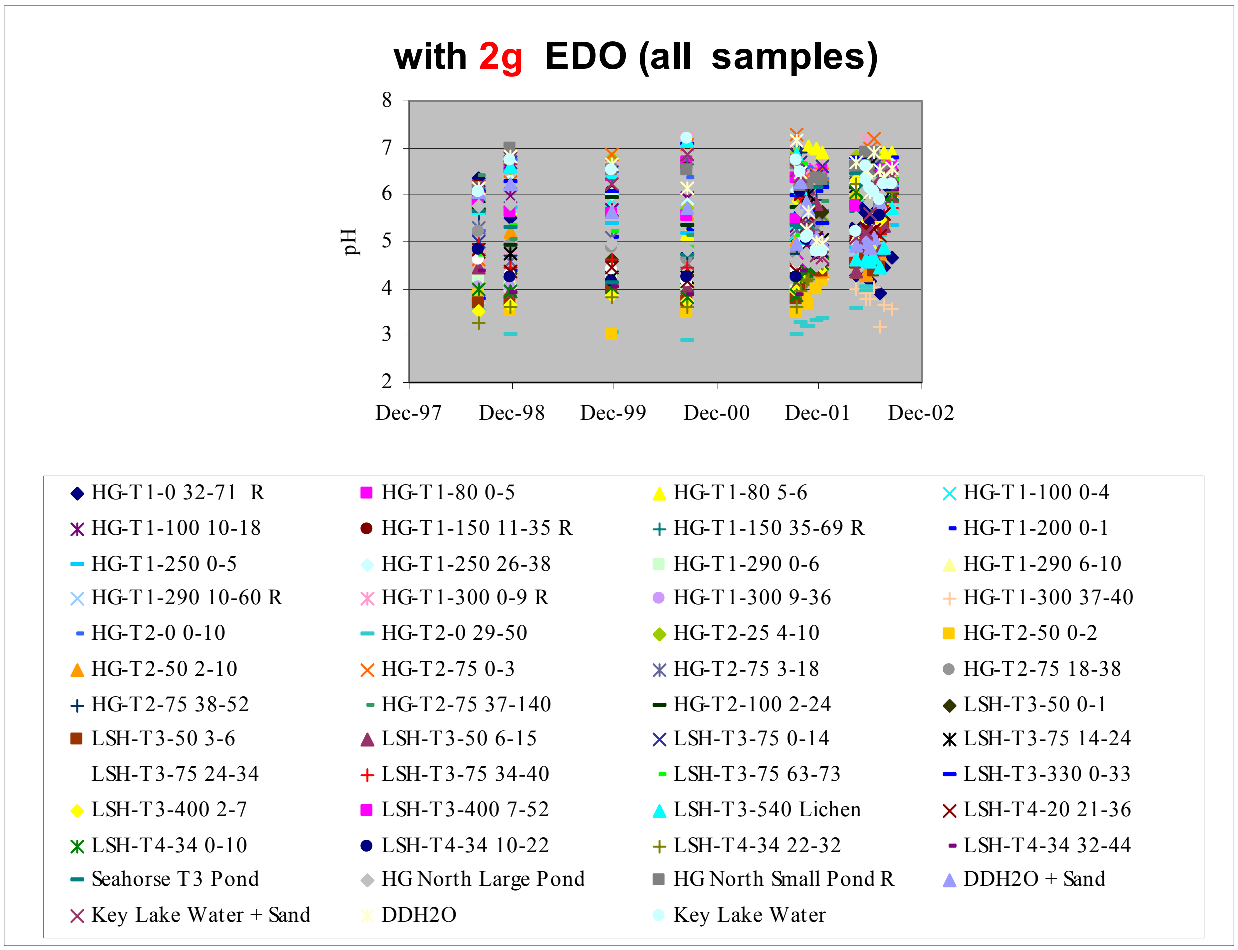
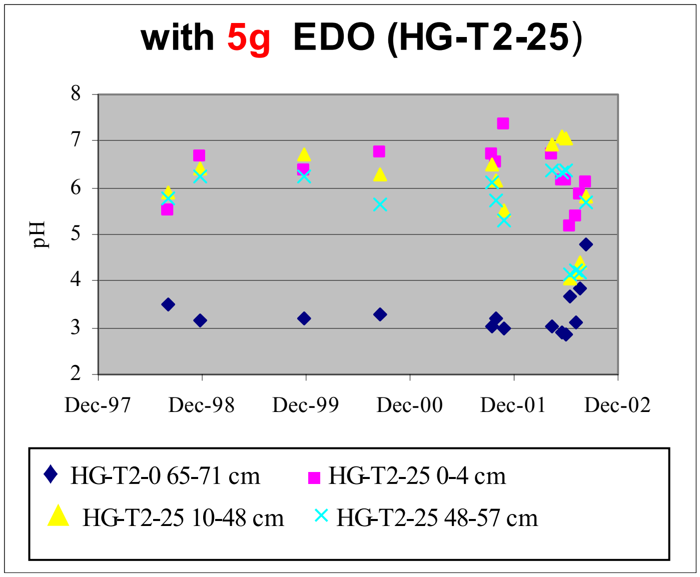


Figure 5b: pH of OSZW with Sediment 2g EDO



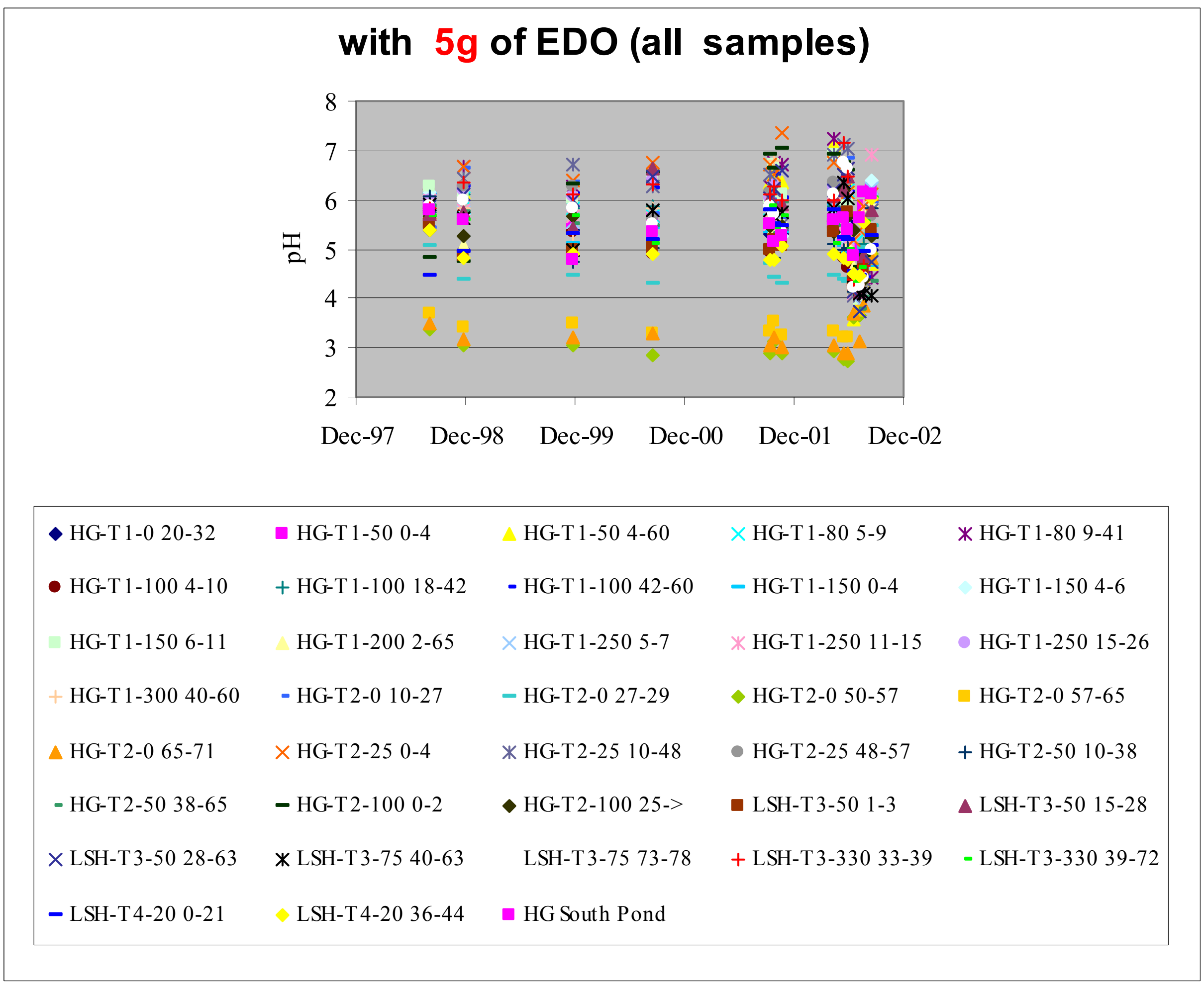


Figure 5c: pH of OSZW with Sediment 5g EDO

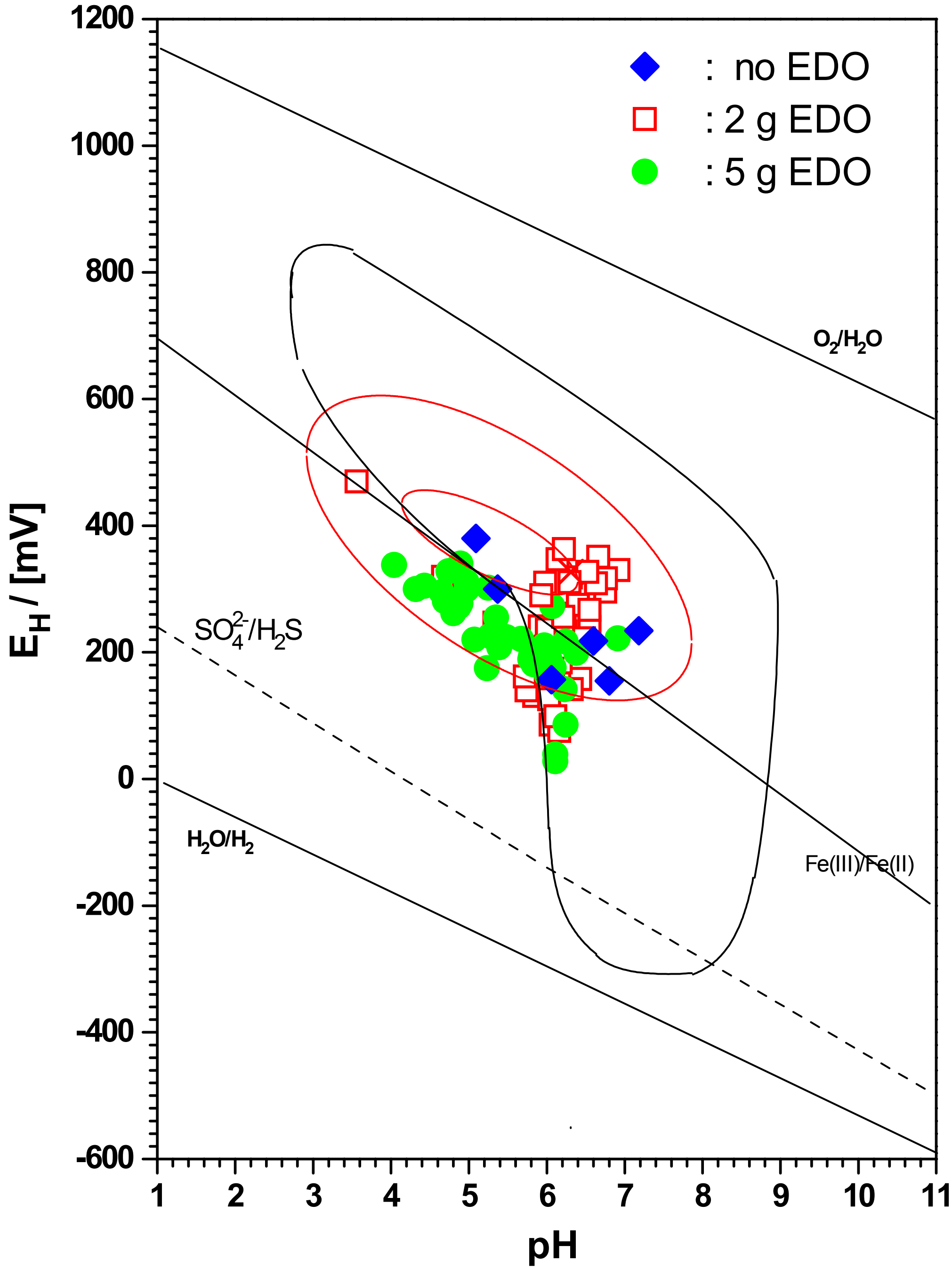


Figure 6a: A comparison of E_H/pH conditions in 47 samples (OSZW) before and 4 weeks after 2g EDO addition

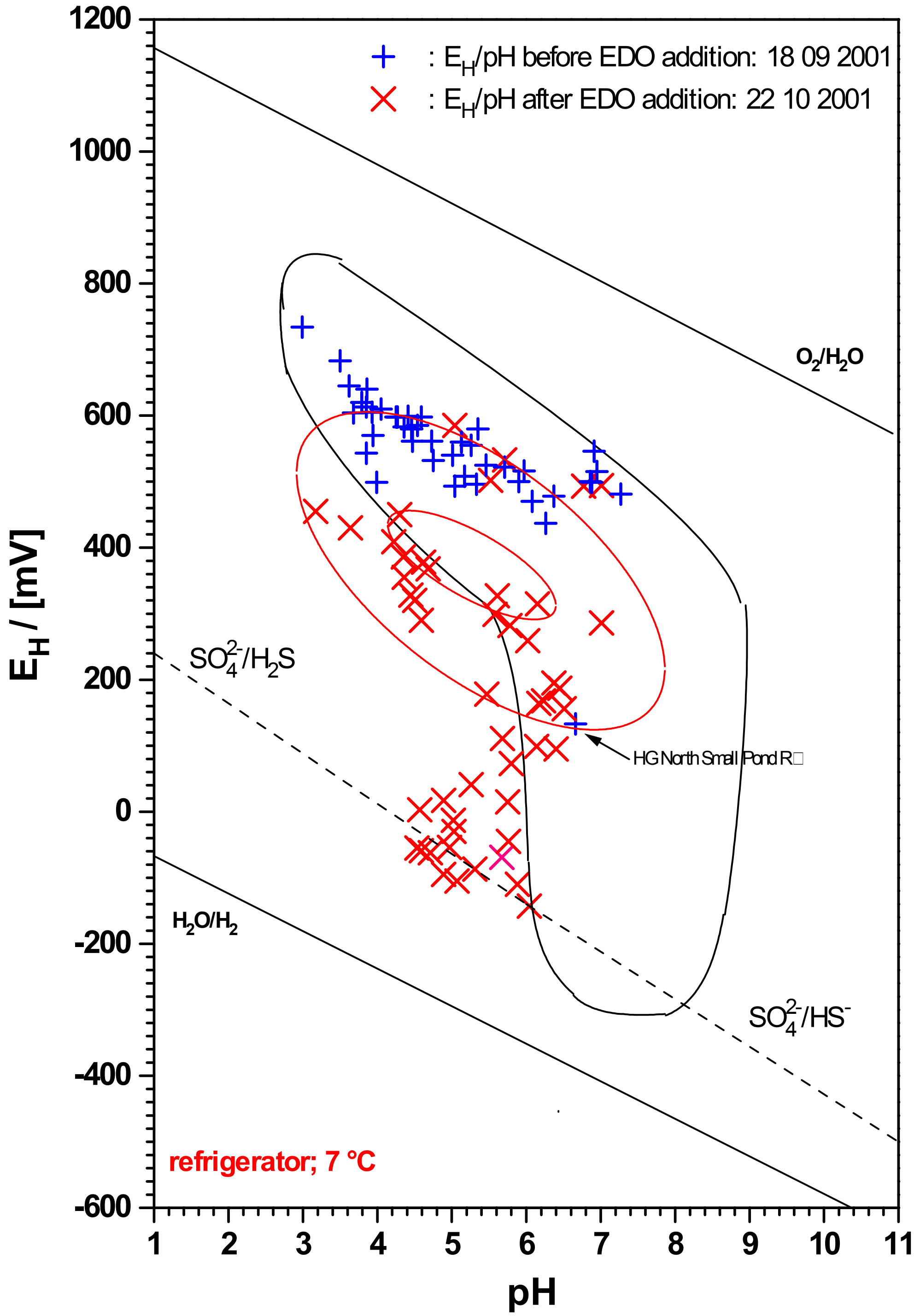


Figure 6b : E_H versus pH of OSZW and SZW from 47 samples after addition of 2 g EDO in April, 2002, as measured on August 18, 2002, just before the samples were taken from the refrigerator and kept at ambient temperatures.

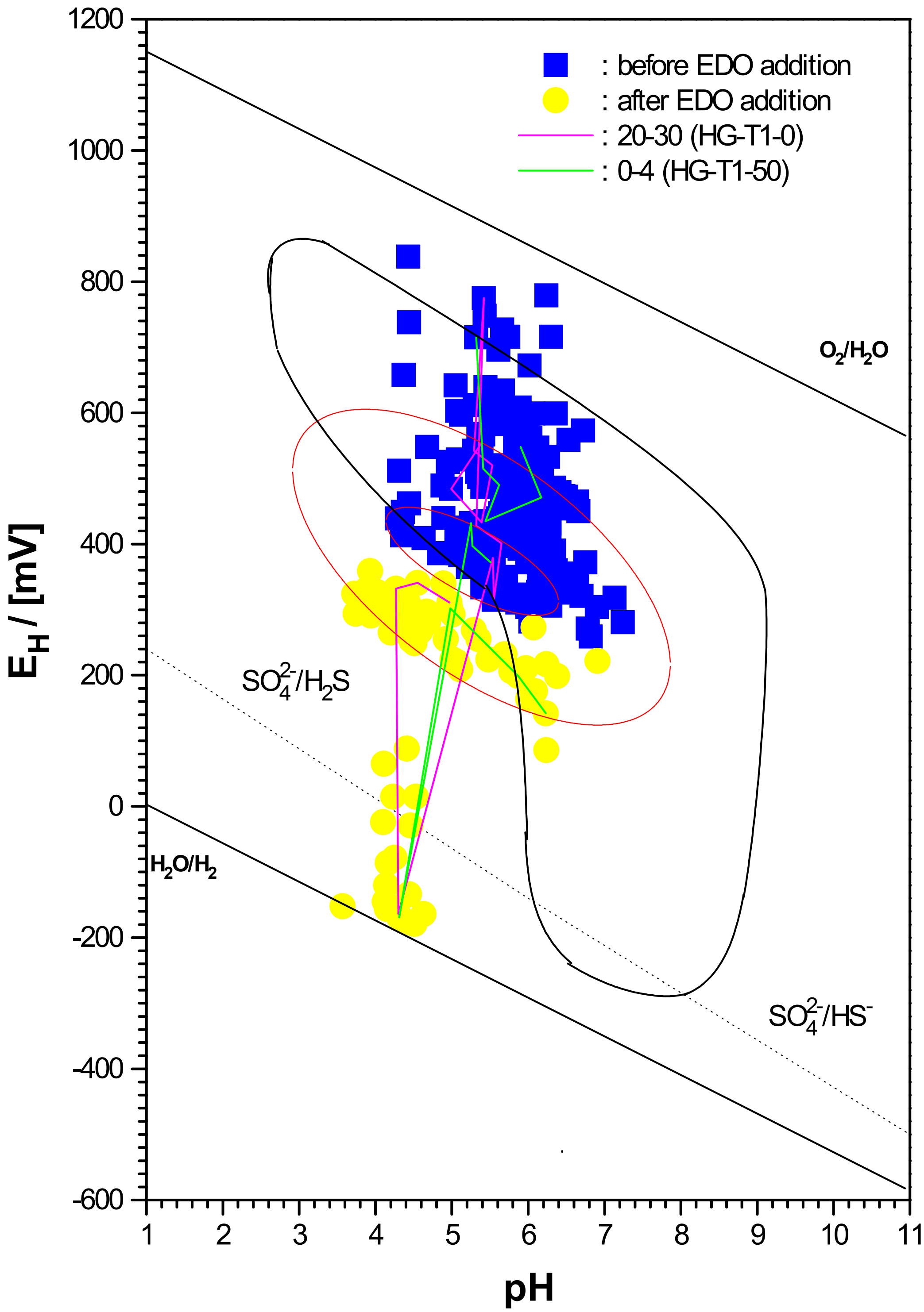


Figure 7: Selected E_H/pH values for 5g samples (first 18) **-** OSZW before and 2 months after 5g EDO addition. Data for 18 samples are given to avoid overcrowding of the figure. EDO addition is shown in yellow circles, blue squares are before the EDO addition. The straight (time) lines (pink and green) connect points of successive measurements for two typical samples.

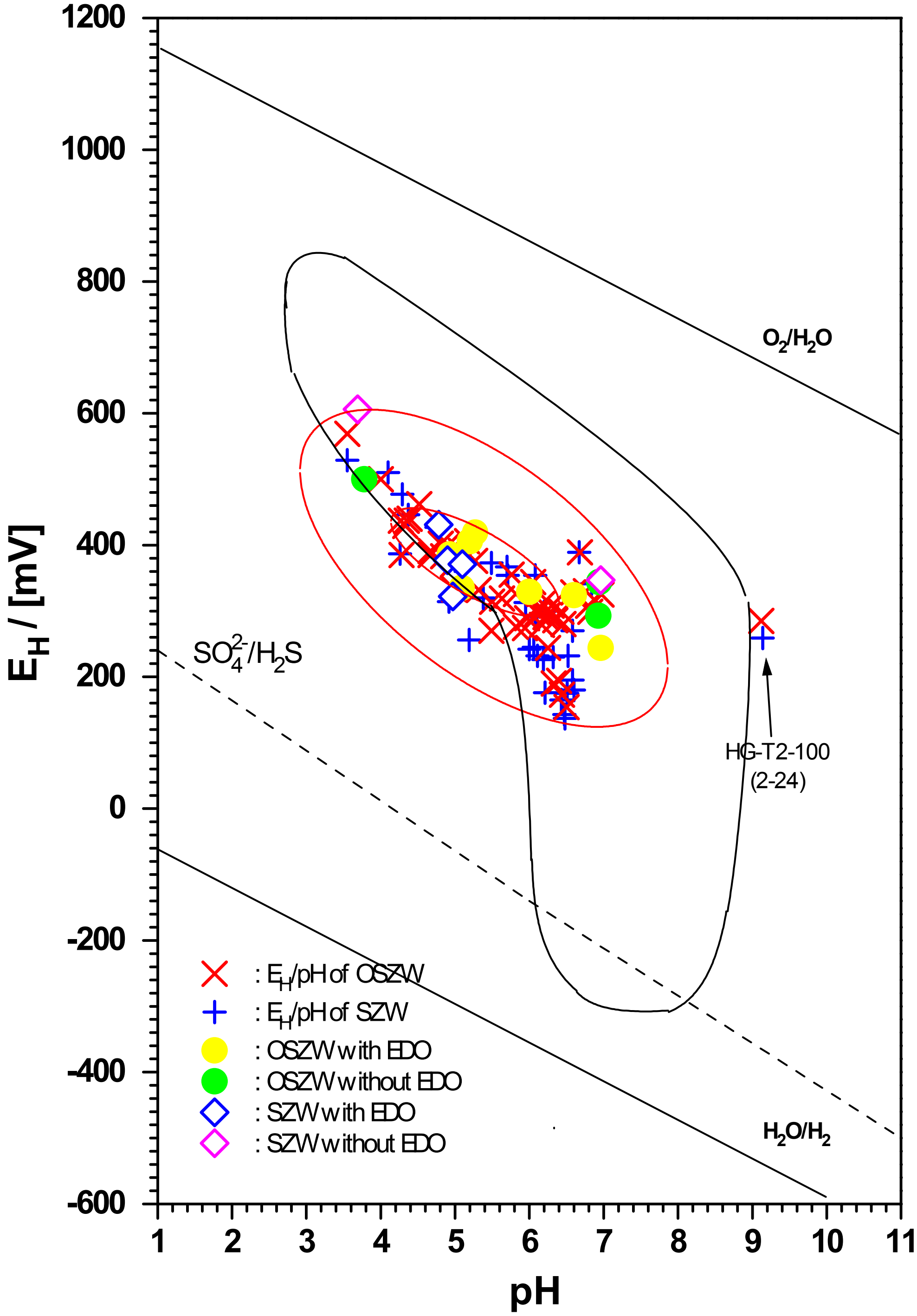


Figure 8: A comparison of final E_H/pH values for all samples - OSZW and SZW for 47 samples having received 2 g EDO to the controls without and with EDO at the end of experimentation period in April, 2002.

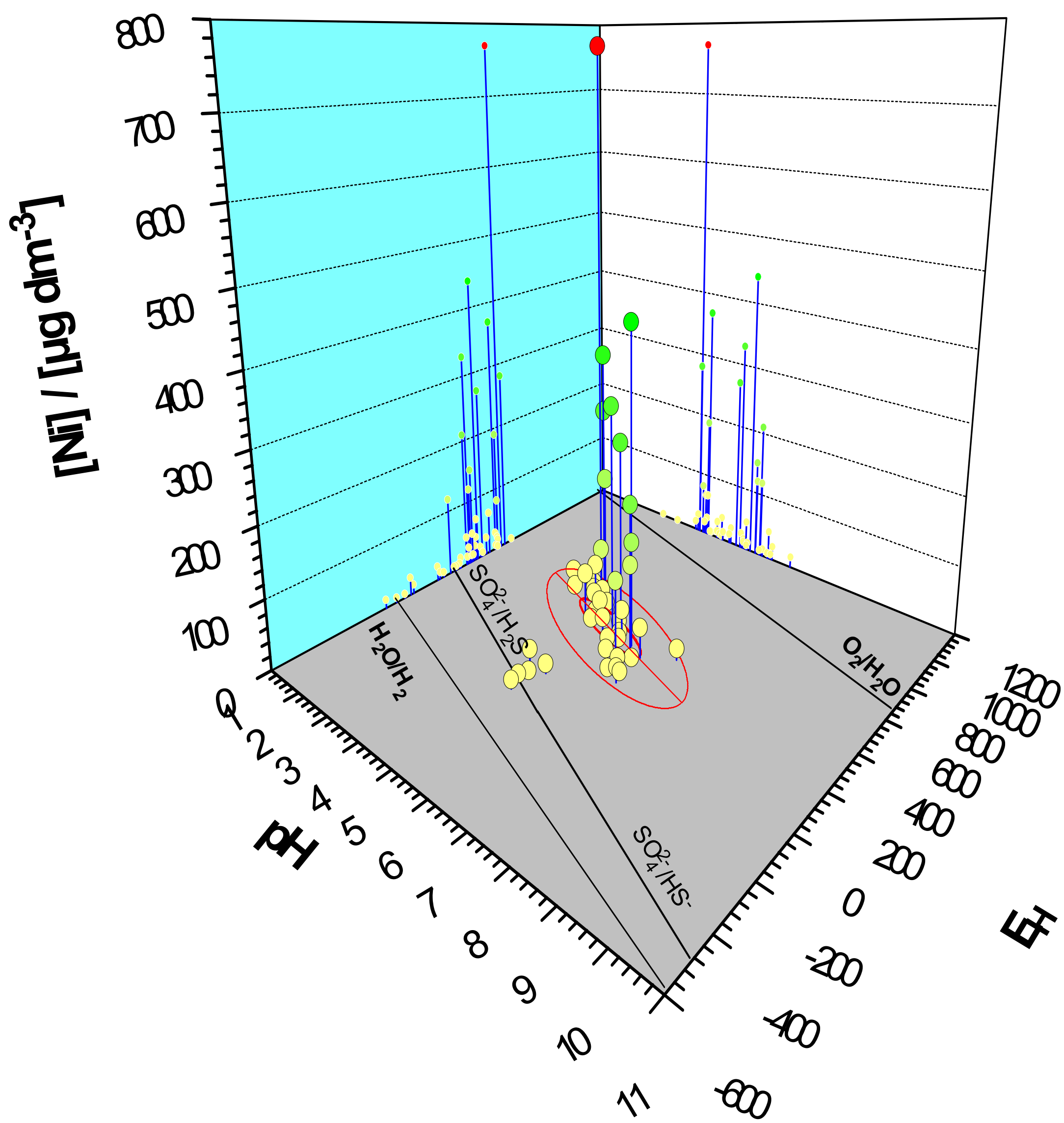


Figure 9: A 3D representation of E_H/pH/Ni parameters, measured on October 22nd 2001, i.e. one month after the samples had received 2g EDO and the related short-term E_H depression would have taken place. The z-values (Ni concentrations) are projected to the xz- and yz-back planes. The E_H/pH diagram is given by the grey xy-plane. Red ellipses indicate the E_H/pH range observed for inert controls, representing the normal variability to be expected.

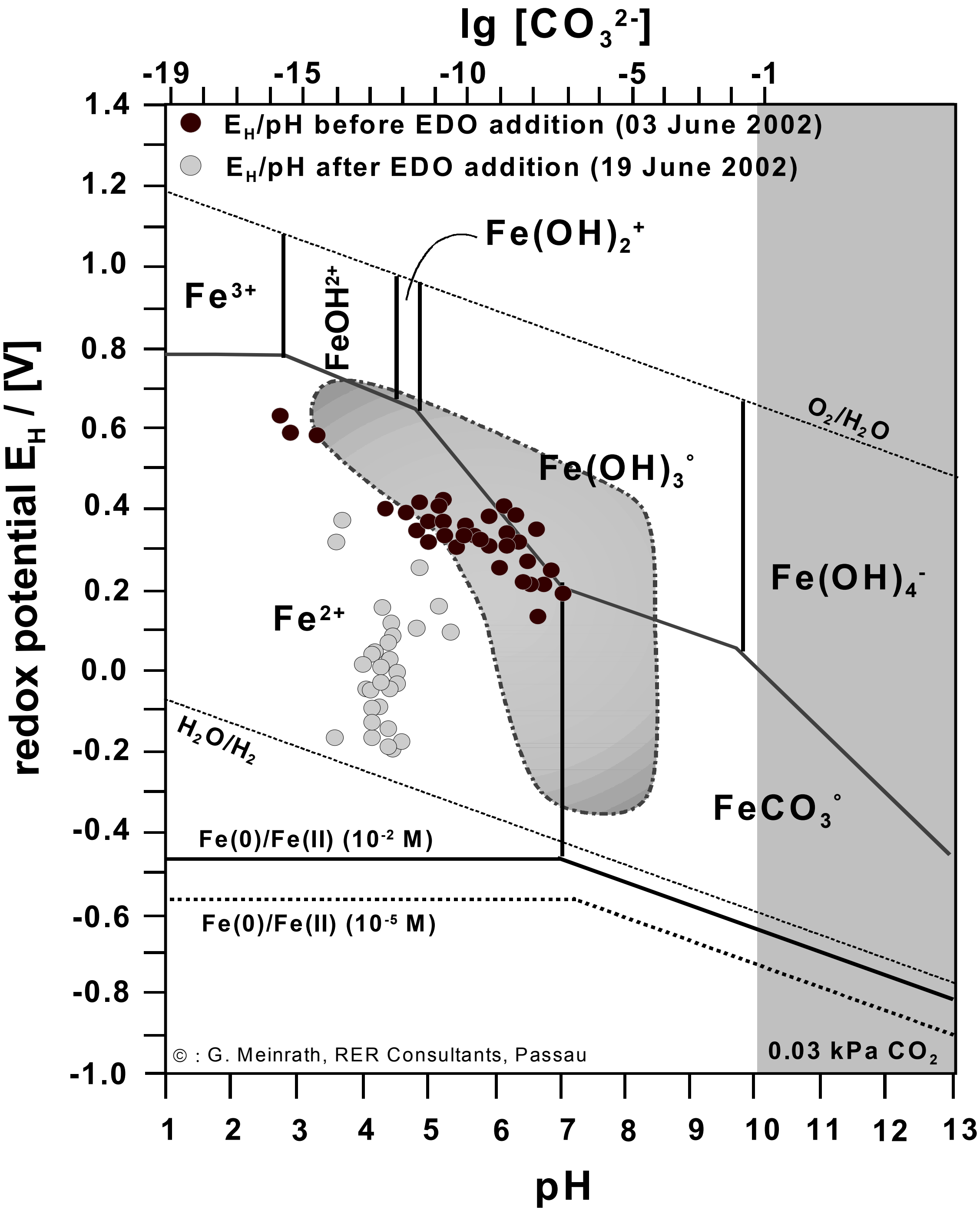


Figure 10: A graphical presentation of the E_H/pH measurement data obtained from 37 samples before and after addition of 5g EDO.

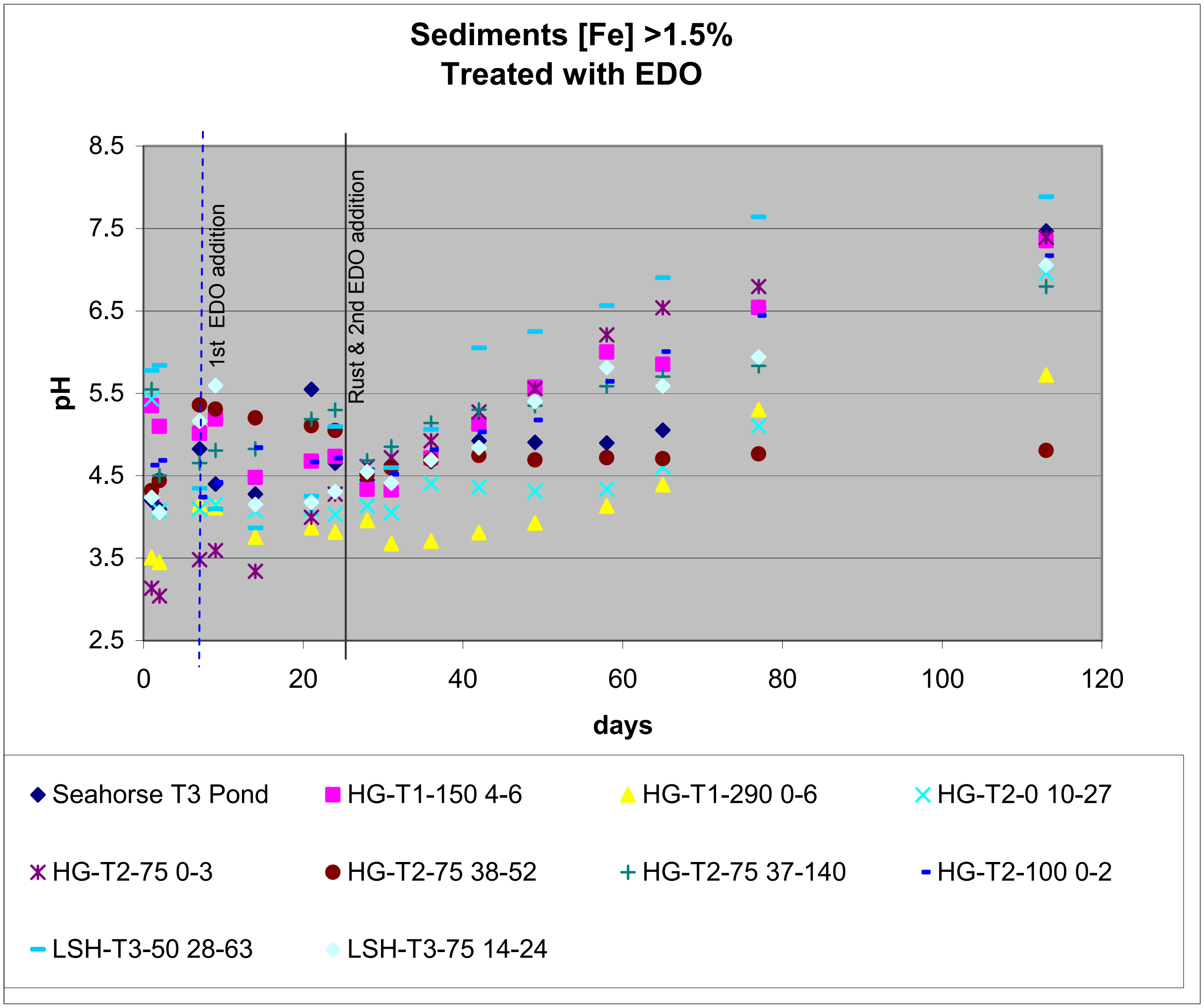


Figure 11a: Amended Saturated Zone Water pH

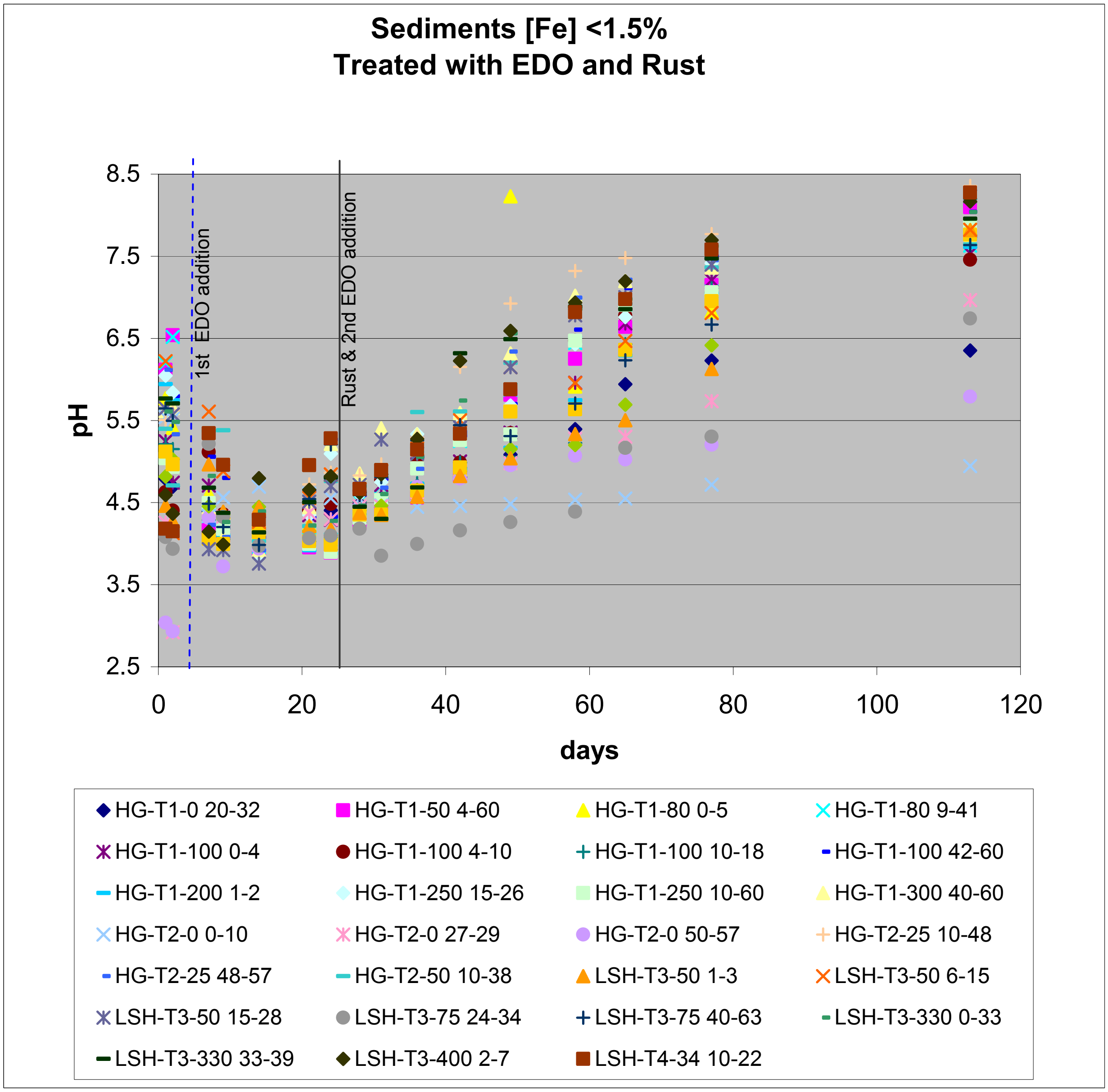


Figure 11b: Amended Saturated Zone Water pH

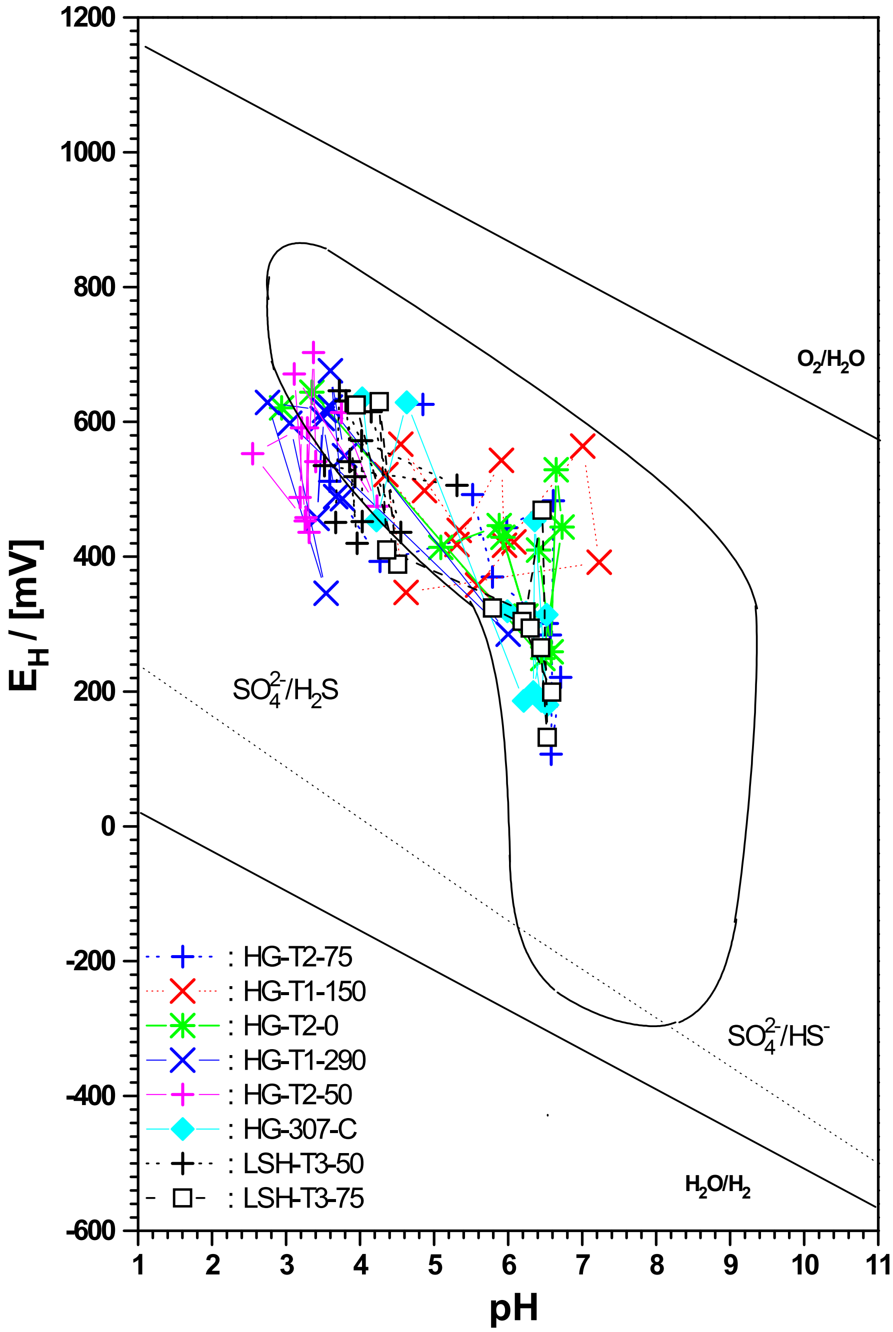


Figure 12: Development of E_H/pH in eight undisturbed sediment columns with samples from different lake transects. E_H/pH values in the DPW of these columns change over the observation period 54 months (see straight time lines). Most samples stay within the region established by Baas-Becking et al. (1960) for natural aqueous systems. The lower edge of the cluster of observed E_H/pH values correlates closely with the lower boundaries of these stability limits, which reflect the region of thiobacteria and iron bacteria.

Table 1a: Monitoring and Amendment Summary of OSZW and SZW

Monitoring and Amendment	1998	1999	2000	2001	2002
OSZW collected	3	1	1	6	8
SZW collected				1	1
2g of EDO added				47%	
5g of EDO added					42%
No Amendment	11%				
7°C					
20°C					

Table 1b: Sampling Summary of DPW

Type of Samplings	1999	2000	2001	2002	2003
DPW syphoned out and replaced	3	5	1	1	1
SSW Sampled				1	1
Total Column Drained	1				
Column Take down					1

Table 2: OSZW and SZW Chemistry for Control samples

Control Jars	Water	pH		Eh, mV		Cond, uS/cm		Acidity, mg/L	
		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
		1187 days	1355 days	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days
Without EDO									
DDH_2O #3	OSZW	6.46	6.93	323	293	70	97	5	5
DDH_2O + Sand #3	OSZW	4.10	3.78	501	500	112	99	16	20
	SZW	4.09	3.69	498	606	115	106	17	27
Key Lake Water + Sand #3	OSZW	6.54	6.94	322	344	84	78	7	6
	SZW	6.64	6.96	325	347	79	75	7	6
With 2g of EDO									
DDH_2O + Sand #1	OSZW	5.69	4.93	174	386	194	177	26	79
	SZW	4.83	4.90	153	377	194	176	173	162
DDH_2O + Sand #2	OSZW	5.74	5.27	314	419	150	159	73	39
	SZW	5.05	4.78	281	431	191	176	147	134
Key Lake Water + Sand #1	OSZW	4.62	6.00	462	329	177	147	124	33
	SZW	4.60	5.10	426	371	176	167	127	82
Key Lake Water + Sand #2	OSZW	5.34	5.09	365	335	172	168	75	110
	SZW	4.73	4.97	385	322	231	172	200	138
Distilled Water and Key Water Only									
DDH_2O #1	OSZW	5.64	6.69	364	244	169	165	55	59
DDH_2O #2	OSZW	5.39	6.60	363	324	168	154	62	15
Key Lake Water	OSZW	5.12	5.20	385	406	154	161	63	14

Table 3: [Ni] and [Fe] in Controls before EDO and at End of Experiment

Background Jars	Ni mg/L						Fe mg/L				
	11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01	18-Aug-02	1-Dec-98	1-Dec-98	22-Aug-00	18-Sep-01	18-Aug-02
DDH2O + Sand #1	0.004	0.003	0.007	0.012	0.013	0.009	<0.3	0.016	0.021	0.029	0.45
DDH2O + Sand #2	0.001	<0.001	0.008	0.014	0.016	0.008	<0.3	0.007	0.024	0.56	0.18
DDH2O + Sand #3	0.002	0.001	0.008	0.017	0.018	0.042	<0.3	0.005	0.079	1.1	1.06
Key Lake Water + Sand #1	0.001	0.002	na	0.014	0.006	0.006	<0.3	0.016	0.021	0.003	0.79
Key Lake Water + Sand #2	<0.001	0.002	0.005	0.015	0.003	0.007	<0.3	0.012	0.011	0.001	0.18
Key Lake Water + Sand #3	<0.001	<0.001	0.004	0.014	0.005	0.002	<0.3	0.005	0.034	0.002	0.019
DDH2O #1	<0.001	<0.001	0.002	0.002	<0.001	0.008	<0.3	0.009	0.006	0.002	0.29
DDH2O #2	<0.001	<0.001	0.002	0.004	<0.001	0.006	<0.3	0.005	0.011	0.004	0.23
DDH2O #3	<0.001	<0.001	0.001	0.003	<0.001	<0.001	<0.3	0.004	0.011	0.004	0.005
Key Lake Water #1	0.002	<0.001	0.003	0.015	<0.001	0.006	<0.3	0.003	0.052	<0.001	0.45

Jars with EDO addition. na: not applicable.

Table 4a: pH of OSZW Without and With 2g and 5g of EDO

Without EDO

Statistic Parameter	pH			
	original pH < 5		original pH > 5	
	7 °C	22 °C	7 °C	22 °C
N-jar	1	1	7	7
N-tested	10	7	73	48
Min	4.85	5.72	4.26	3.79
Max	6.52	6.27	7.26	7.26
Avg	5.63	6.06	5.23	5.02

2g of EDO

Statistic Parameter	pH					
	original pH < 5			original pH >5		
	before	after	after	before	after	after
	7 °C		22 °C	7 °C		22 °C
N-jar	21	21	21	26	26	26
N-tested	105	124	126	130	155	181
Min	2.88	3.17	3.17	4.10	4.24	3.89
Max	7.27	6.76	7.22	7.14	7.01	6.92
Avg	3.84	4.30	4.77	5.20	5.10	5.28

5g of EDO

Statistic Parameter	pH					
	original pH < 5			original pH >5		
	before	after	after	before	after	after
	7 °C		22 °C	7 °C		22 °C
N-jar	5	5	5	33	33	33
N-tested	40	10	20	260	66	132
Min	2.84	2.74	3.11	4.28	4.35	3.57
Max	7.03	6.77	5.27	7.36	7.14	6.91
Avg	3.37	3.13	3.97	5.40	5.32	4.38

Table 4b: E_H (mV) of OSZW Without and With 2g and 5g of EDO

Without EDO

Statistic Parameter	E_H, mV			
	original pH < 5		original pH > 5	
	7 °C	22 °C	7 °C	22 °C
N-jar	1	1	7	7
N-tested	10	7	74	48
Min	-4	157	9	-98
Max	670	293	771	460
Avg	329	213	429	269

2g of EDO

Statistic Parameter	E_H, mV					
	original pH < 5			original pH >5		
	before	after	after	before	after	after
	7 °C		22 °C	7 °C		22 °C
N-jar	20	20	20	26	26	26
N-tested	100	120	140	130	153	182
Min	409	-475	33	375	-360	-16
Max	763	954	494	860	865	444
Avg	551	271	201	581	254	181

5g of EDO

Statistic Parameter	E_H, mV					
	original pH < 5			original pH >5		
	before	after	after	before	after	after
	7 °C		22 °C	7 °C		22 °C
N-jar	5	5	5	33	33	33
N-tested	38	10	20	262	66	132
Min	281	311	-179	178	141	-176
Max	775	432	359	1196	677	395
Avg	473	60	166	529	360	195

Table 5: Summary of Ni and Fe Released to OSZW (2002 subtracted 1998)						
Element	Treatment	N	Mean	Min	Max	Note
Ni, ug/sample	No EDO	7	-32	-155	35	4 negative values
	2g EDO	46	-145	-976	2	43 negative values
	5g EDO	37	-17	-125	3	24 negative values
Fe, ug/sample	No EDO	8	9730	-123	66853	1 negative value
	2g EDO	45	-680	-18164	192	5 negative values
	5g EDO	37	46	-2320	193	5 negative values

Table 6: Summary of Ni and Fe Mass Before and After EDO Addition						
Statistic Parameter	Before EDO Addition			After EDO Addition		
	No EDO	2g EDO	5g EDO	No EDO	2g EDO	5g EDO
Ni, ug/sample						
N-Jar	8	47	38	8	47	38
N-Test	39	240	187	7	46	38
Mean	16.9	254	16.9	20.5	210.8	99.9
Median	5.7	95	7.4	9.6	13.1	29.6
Min	0.006	0.615	0.615	2.14	1.2	-55.8
Max	150	2091	176.7	53.5	7490	589
Fe, ug/sample						
N-Jar	8	47	37	8	45	38
N-Test	32	188	151	8	45	37
Mean	2665	1396	485	9730	-680	46.4
Median	23.0	28.3	10.6	30.5	152	185.7
Min	0.615	0.577	0.615	-123	-18164	-2320
Max	44880	43560	18480	66853	192	193

Table 7: Ni Mass Released to DPW Simulating Lake Water

Column	Total Ni Mass in Sediment mg	Total Ni Released	
		mg	%
HG-T1-150	308	0.17	0.06
HG-T1-290	268	1.2	0.45
HG-T2-0	43	0.35	0.81
HG-T2-50	407	5.1	1.25
HG-T2-75	950	9.3	0.98
LSH-T3-50	84	3.0	3.57
LSH-T3-75	573	6.9	1.20
HG 370C	329	0.6	0.18

APPENDIX 1

DETAILED DATA

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APPENDIX 1 DETAILED DATA

APPENDIX 1

DETAILED DATA

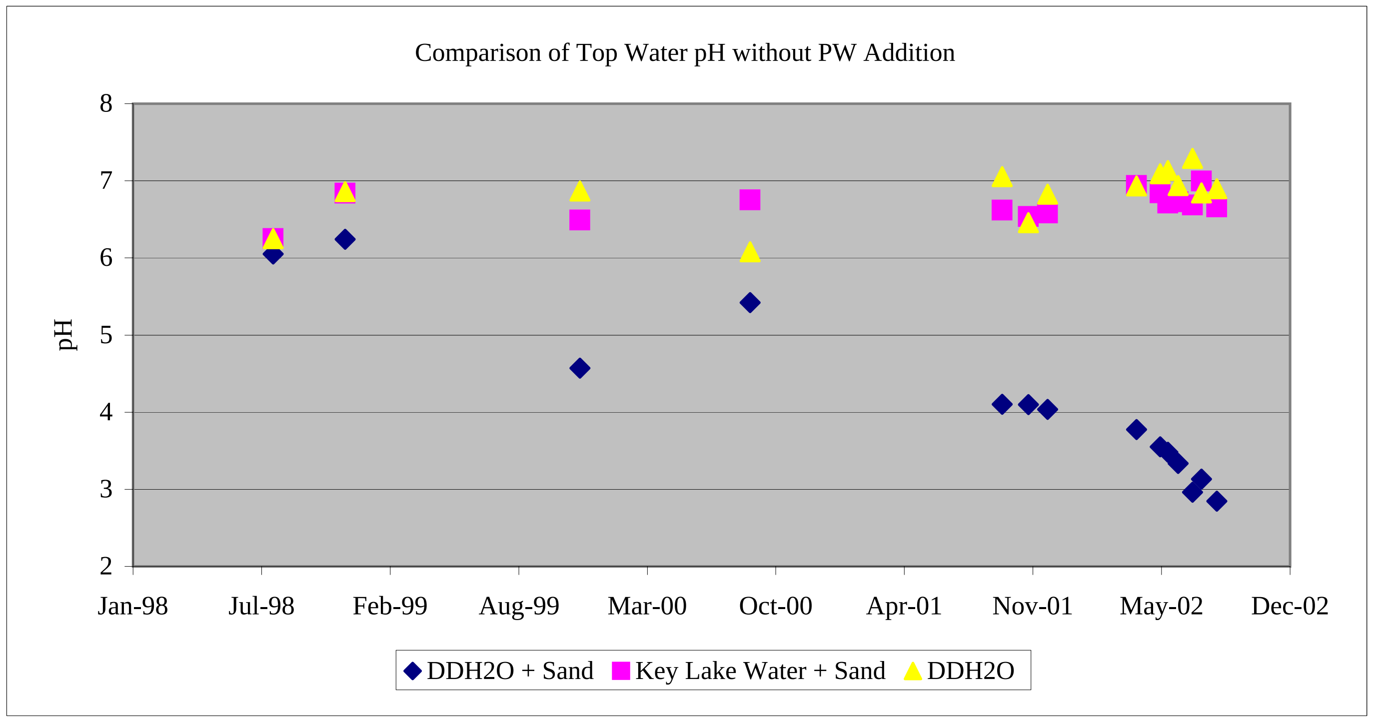
Appendix 1-1 Legend to Appendixes

<u>The Appendices utilize the terminology used during the various monitoring period. In the text this has been replaced.</u>

Appendices	Text
Samples refrigerated or held at room temperature	
Potato waste or PW amendment	<u>Easily degradable organics (EDO)</u>
Pore water in the jars	<u>Saturated Zone Water (SZW)</u>
Top water in jars	<u>Overlaying saturated zone water</u> <u>OSZW</u>
Columns at Room Temperature	
top or surface water	Diffusion product water - (DPW)
port water	Saturated strata water SSW
Beakers at Room Temperature	
top water	Amended Saturated Zone Water

App1-Table 11a: Changes in Background pH and Acidity over Time (7 oC)

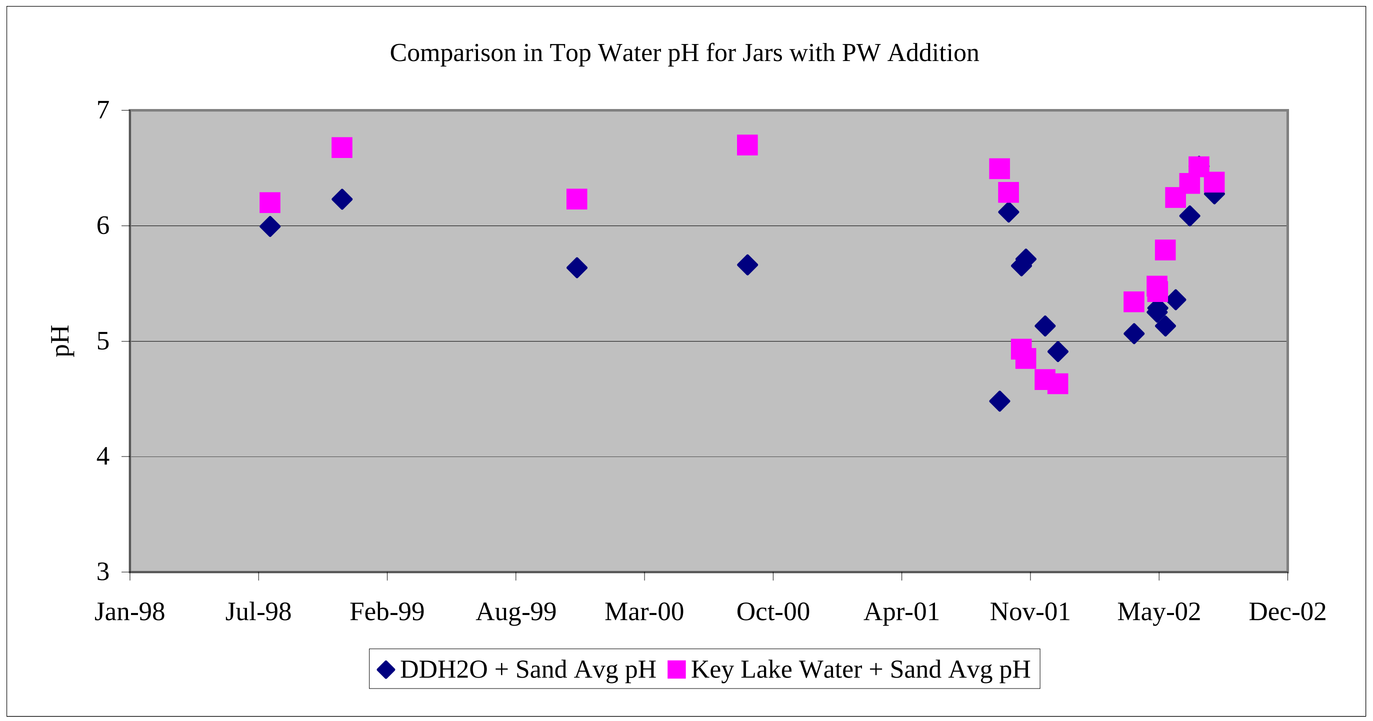
Background Jars	Before Potato Waste Addition					After Potao Waste Addition								
	in Fridge at 7 ^{o}C								in Room at 22 ^{o}C					
	11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01	29-Oct-01	28-Nov-01	15-Apr-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
DDH_2O + Sand	6.05	6.24	4.57	5.42	4.10	4.098	4.04	3.78	3.55	3.48	3.34	2.96	3.13	2.84
Key Lake Water + Sand	6.25	6.84	6.49	6.75	6.62	6.535	6.58	6.94	6.84	6.71	6.73	6.68	7.00	6.66
DDH_2O	6.25	6.86	6.87	6.08	7.06	6.459	6.826	6.93	7.09	7.14	6.94	7.29	6.84	6.90



App1-Table 11b: Comparison of pH between Distilled Water and Key Lake Water with PW Addition

Background Jars — Before Potato Waste Addition — in Fridge at 7 ^{o}C — After Potao Waste Addition — in Room at 22 ^{o}C

	11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01	2-Oct-01	22-Oct-01	29-Oct-01	28-Nov-01	18-Dec-01	15-Apr-02	21-May-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
DDH2O + Sand	5.99	6.23	5.63	5.66	4.48	6.12	5.65	5.71	5.13	4.91	5.06	5.25	5.29	5.13	5.36	6.08	6.51	6.28
Key Lake Water + Sand	6.20	6.68	6.23	6.70	6.49	6.29	4.93	4.85	4.66	4.63	5.34	5.47	5.43	5.79	6.24	6.36	6.51	6.38



App1-Table 8a: Top Water pH

Location	Depth (cm)	Before Potato Waste Addition					After Potao Waste Addition												
							in Fridge at 7 ^{o}C							in Room at 22 ^{o}C					
		11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01 PW addition	2-Oct-01	22-Oct-01	29-Oct-01	28-Nov-01	18-Dec-01	15-Apr-02	21-May-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
HG-T1-0	0-20	5.58	4.41	4.26	4.8	4.41	5.10	5.61	5.61	5.10	5.16	5.88	6.18	6.08	5.91	6.02	6.02	5.97	6.06
	20-32	5.39	4.99	5.39	5.53	5.29	5.42		5.32			5.65		5.55	5.54	4.30	4.27	4.55	4.97
	32-71	5.81	4.78	4.85	5.01	4.51	4.80	4.67	4.67		4.70	4.62	4.82	4.65	4.66	4.52	4.60	4.77	5.09
	32-71 R	6.37	5.52	6.02	4.75	5.04	5.77	5.78	5.78	4.79	4.24	4.28	4.27	4.57	4.15	4.39	3.89	4.46	4.67
HG-T1-50	0-4	5.9	6.17	5.44	5.62	5.41	5.32					5.51		5.27	5.25	4.31	4.98	5.87	6.23
	4-60	5.85	6.16	6.20	6.46	6.34	6.50		6.36			7.13		6.36	6.34	3.57	3.93	5.01	4.69
HG-T1-80	0-5	5.8	6.57	6.39	6.68	6.37	6.28	6.52	6.37	6.45	6.51	6.35	6.53	6.78	6.75	6.64	6.52	6.60	6.75
	5-6	5.94	5.72	6.10	5.16	5.90	5.96	6.58	7.01	6.98	6.90	6.46	6.55	6.62	6.66	6.63	6.54	6.88	6.92
	5-9	5.87	6.02	5.82	5.66	5.56	5.60					6.14		5.86	6.20	4.51	4.31	5.29	6.24
	9-41	5.95	6.66	6.26	6.41	6.25	6.75		6.70			7.24		6.51	6.64	4.15	4.19	4.42	4.43
HG-T1-100	0-4	5.92	6.27	5.87	5.58	5.17	5.86	6.20	6.40	5.64	5.53	6.17	6.08	5.94	5.66	6.29	5.55	6.22	5.94
	4-10	6.18	5.72	5.35	4.88	4.95	5.05		5.06			5.55		4.83	4.63	4.41	4.20	4.41	5.35
	10-18	6.05	5.96	5.68	5.94	5.33	6.24	5.70	5.80	4.89	4.79	4.99	5.04	4.94	4.90	5.51	5.72	6.29	6.23
	18-42	6.08	6.12	5.83	5.85	5.66	6.24		5.41			5.85		5.99	5.90	4.14	4.47	5.11	6.09
	42-60	6.1	6.28	6.12	6.22	6.15	6.53		6.02			6.12		6.29	6.13	4.12	3.88	4.42	5.07
HG-T1-150	0-4	6.12	5.7	5.12	5.41	5.33	5.66		5.33			5.89		5.07	4.89	4.40	3.96	4.67	4.65
	4-6	6.14	5.69	5.67	5.49	5.81	6.02		5.28			6.28		5.31	5.19	4.44	4.43	5.69	6.38
	6-11	6.26	6.12	6.03	6.41	5.89	6.72		6.12			6.90		5.99	6.01	4.23	3.94	4.55	5.97
	11-35	6.13	6.39	6.20	7.14	6.35	6.68	6.61	6.61	6.42	6.99	6.96	6.90	6.39	6.38	6.54	6.31	6.21	6.80
	11-35 R	6.19	6.69	6.07	6.56	6.77	6.26	4.89	4.89	4.46	4.40	4.98	4.92	5.23	5.15	5.09	5.47	5.87	6.17
	35-69	6.1	6.65	5.56	6.78	6.58	6.67	6.59	6.59	6.89	6.94	6.77	6.79	6.62	6.56	6.61	6.21	6.25	7.18
	35-69 R	6.12	6.83	6.41	6.63	7.01	6.36	5.02	5.02	4.86	4.82	5.63	5.91	6.37	6.18	6.29	6.19	6.49	6.19
HG-T1-200	0-1	3.78	4.35	5.09	5.24	4.47	6.10	6.45	6.45	6.05	6.14	6.59	6.49	6.63	6.49	6.71	6.52	6.63	6.76
	1-2	5.9	6.03	6.41	6.7	6.29	6.63		6.56			6.94		7.26	7.23	4.21	3.79	4.19	5.37
	2-65	5.51	5.08	5.44	5.36	5.62	5.43		5.60			6.14		5.60	5.11	4.63	4.59	5.78	6.00
HG-T1-250	0-5	5.89	5.7	5.40	5.15	5.52	6.19	5.26	5.26	4.52	4.55	4.88	5.16	5.15	5.08	5.52	5.67	6.26	5.33
	5-7	5.92	5.74	5.56	5.4	5.50	5.74		5.87			5.71		5.40	5.21	4.25	3.89	4.49	6.24
	11-15	6	5.79	5.67	5.63	5.52	5.61		5.86			5.89		5.35	5.19	4.11	4.51	5.87	6.91
	15-26	5.99	6.2	6.07	6.37	6.04	6.30					6.26		6.21	6.16	4.16	3.74	4.46	6.07
	26-38	5.95	6.33	6.02	5.82	6.08	6.01	4.84	4.71	4.58	4.52	5.27	5.73	5.63	5.81	6.02	5.85	6.33	6.63
HG-T1-290	0-6	4.2	4.02	4.18	4.05	3.94	5.25	5.03	4.50	4.65	4.89	6.43	6.27	6.41	6.34	6.57	6.05	6.34	5.98
	6-10	4.77	4.16	4.18	4.14	3.99	4.45	4.62	4.68	4.45	4.33	5.08	5.55	5.56	5.63	5.64	5.41	5.91	6.02
	10-60	5.95	5.57	4.50	5.38	5.23	5.87	6.30	6.30	5.42	5.81	6.30	6.10	5.76	5.70	5.84	5.14	6.03	6.31
	10-60 R	5.85	5.75	6.65	5.44	5.71	6.17	4.97	4.97	4.73	4.63	4.84	4.78	5.06	4.69	5.53	5.77	6.37	5.98
HG-T1-300	0-9	4.85	5.33	5.98	6.15	6.42	6.31	6.38	6.38	6.52		6.18	6.22	6.17	6.20	6.27	5.72	6.24	5.93
	0-9 R	4.69	4.86	6.53	7.19	6.95	6.65	6.51	6.51	6.46	6.61	6.76	6.63	7.17	6.70	6.63	6.20	6.55	6.40
	9-36	4.04	4.01	3.98	3.75	3.85	4.00	4.15	4.30	4.67	4.62	6.11	6.27	6.30	6.43	6.46	5.63	6.22	5.91
	37-40	3.67	3.72	3.82	3.71	3.68	4.08	4.37	4.36	4.52	4.30	3.98	3.90	3.78	3.77	4.05	3.17	3.64	3.56
	40-60	5.98	5.83	5.30	5.82	5.67	6.78					5.83		5.71	5.71	4.10	3.72	4.32	4.89

App1-Table 8a: Top Water pH

Location	Depth (cm)	Before Potato Waste Addition					After Potao Waste Addition												
		in Fridge at 7 °C												in Room at 22 °C					
		11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01 PW addition	2-Oct-01	22-Oct-01	29-Oct-01	28-Nov-01	18-Dec-01	15-Apr-02	21-May-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
HG-T2-0	0-10	5.2	6.72	6.49	6.34	6.26	6.63	6.57	6.14	6.45	6.30	5.97	6.12	6.19	6.54		6.26	6.43	6.66
	10-27	5.41	6.64	6.36	5.72	5.97	5.89		5.63			5.63		6.03	6.82	4.53	4.02	4.92	5.93
	27-29	5.07	4.37	4.44	4.31	4.68	4.43		4.28			4.44		4.36	4.35	4.46	4.32	5.01	5.48
	29-50	3.52	3.01	3.07	2.88	2.99	3.28	3.17	3.17	3.31	3.35	3.55	4.04	3.94	4.93	5.73	5.11	5.72	5.84
	50-57	3.35	3.04	3.04	2.84	2.90	3.15		2.90			2.92		2.75	2.74	3.60	3.65	4.24	4.89
	57-65	3.71	3.41	3.49	3.3	3.33	3.52		3.27			3.34		3.21	3.21	4.23	3.73	4.26	4.87
	65-71	3.5	3.16	3.19	3.27	3.05	3.19		3.00			3.03		2.90	2.87	3.68	3.11	3.85	4.80
HG-T2-25	0-4	5.5	6.66	6.37	6.75	6.71	6.52		7.36			6.73		6.17	6.15	5.17	5.38	5.85	6.11
	4-10	5.95	6.55	6.79	5.73	6.91	5.95	5.66	6.04	5.44	5.45	6.82	6.44	6.73	6.73	6.85	6.60	6.59	6.43
	10-48	5.92	6.43	6.73	6.28	6.49	6.17		5.50			6.93		7.11	7.04	4.05	4.21	4.38	5.80
	48-57	5.76	6.26	6.25	5.63	6.13	5.72		5.30			6.36		6.34	6.38	4.14	4.24	4.17	5.67
HG-T2-50	0-2	3.88	3.54	3.02	3.48	3.50	3.83	3.78	3.64	3.99	4.15	5.94	6.18	6.11	6.30	6.35	6.27	5.69	5.99
	2-10	6.16	5.23	4.26	5.58	5.04	6.10	5.07	5.07	4.42	4.37	4.35	4.29	4.34	4.42	4.64	4.76	5.45	6.08
	10-38	6.06	5.26	4.75	5.01	5.11	4.82		5.05			5.10		4.98	5.04	4.14	4.19	4.75	5.83
	38-65	5.85	5.76	5.49	5.47	5.45	5.31		5.96			5.48		5.47	5.41	4.32	3.77	4.02	4.32
HG-T2-75	0-3	4.64	6.26	6.85	7.06	7.27	6.44	6.39	6.17	6.43	6.43	6.40	6.52	6.64	6.97	7.22	6.47	6.60	6.55
	3-18	5.3	4.57	5.07	4.53	5.26	6.01	5.20	5.88	5.30	5.54	6.25	6.29	6.20	6.60	6.57	6.48	6.37	6.01
	18-38	5.23	4.92	4.89	4.61	4.75	5.44	5.25	5.68	5.37	6.34	6.50	6.49	6.68	6.64	6.74	6.21	6.23	6.05
	38-52	5.6	4.72	4.96	4.75	4.73	6.92	4.94	5.61	5.91	6.26	6.33	6.52	6.71	6.64	6.63	6.39	6.36	6.03
	37-140	6.38	5.05	5.21	5.12	5.01	6.07	5.40	5.31	5.57	5.85	5.82	6.20	6.14	5.83	5.98	6.59	6.38	6.16
HG-T2-100	0-2	4.82	4.73	6.30	6.54	6.92	6.65		7.03			6.92		6.77	6.58	4.89	4.63	4.88	5.23
	2-24	5.66	4.92	5.95	5.34	5.71	6.16	5.179	4.89	4.90	5.36	6.12	6.43	6.58	6.18	6.09	6.24	6.09	6.31
	25->	5.68	5.27	5.65	5.2	5.48	5.72		5.47			5.35		6.17	5.67	5.36	4.31	4.37	5.25
LSH-T3-50	0-1	4.67	4.31	4.6	4.3	4.27	6.00	5.23	5.75	5.64	5.64	6.25	6.42	6.58	6.90	6.30	6.53	6.27	6.52
	1-3	5.51	4.87	4.98	5.01	4.98	5.18		5.06			5.36		5.72	5.74	4.32	4.18	4.58	5.39
	3-6	3.68	3.72	3.93	3.73	3.79	4.01	4.34	4.35	4.36	4.37	4.52	4.93	4.64	4.59	4.38	4.44	5.35	6.08
	6-15	4.44	3.95	4.18	4.03	4.05	5.71	5.93	6.15	5.81	4.75	4.39	4.63	4.61	4.56	4.70	4.83	5.32	5.97
	15-28	5.7	5.74	5.41	6.64	6.04	5.90		5.89			6.07		6.19	6.47	4.29	4.15	4.85	5.79
	28-63	5.85	6.1	5.98	6.46	6.01	6.23		6.61			6.20		6.52	6.63	4.13	3.74	4.10	4.74
LSH-T3-75	0-14	5	6.67	6.49	6.86	6.88	6.68	6.20	5.47	6.42	6.59	6.68	6.39	6.58	6.74	6.61	6.10	6.39	6.14
	14-24	5.98	4.75	4.25	4.24	4.46	5.42	5.75	6.02	5.06	5.05	6.18	6.38	6.50	6.64	6.24	6.08	6.40	6.22
	24-34	4.6	4.3	4.40	4.14	4.41	4.96	4.61	4.62	4.71	4.87	6.22	6.18	6.42	6.04	5.98	5.79	6.31	6.32
	34-40	4.97	4.46	4.63	4.44	4.54	5.92	4.95		4.54	4.46	4.66	4.97	5.02	4.63	4.72	5.17	5.77	5.74
	40-63	5.92	5.62	4.96	5.77	5.78	5.66		5.73			5.83		6.34	6.02	4.44	4.10	4.08	4.04
	63-73	4.7	5.35	5.21	4.89	5.13	6.65	4.77	4.57	4.61	4.66	5.82	6.27	6.46	6.15	6.15	5.89	6.44	6.29
	73-78	5.88	5.98	5.83	5.49	5.87	5.72		5.33			6.12		6.77	6.65	4.21	4.24	4.40	4.97
	0-33	6.05	6.26	6.06	7.07	5.97	5.61	5.34	5.67	5.13	5.38	6.79	6.30	6.61	6.54	6.61	6.36	6.34	6.22

App1-Table 8a: Top Water pH

Location	Depth (cm)	Before Potato Waste Addition					After Potao Waste Addition												
		in Fridge at 7 ^{o}C												in Room at 22 ^{o}C					
		11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01 PW addition	2-Oct-01	22-Oct-01	29-Oct-01	28-Nov-01	18-Dec-01	15-Apr-02	21-May-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
LSH-T3-330	33-39	5.83	6.34	6.11	6.31	6.12	6.29		5.98			5.97		7.14	6.46	4.36	4.44	4.67	6.04
	39-72	5.66	5.58	5.65	5.1	5.87	5.41		5.68			5.08		5.28	4.98	4.34	4.61	5.53	6.01
LSH-T3-400	2-7	3.52	3.64	3.88	3.74	3.93	4.23	4.76	4.59	4.69	4.47	6.30	5.68	5.52	4.85	5.05	5.46	5.97	6.13
	7-52	5.86	5.64	5.60	5.53	5.46	6.42	4.62	4.53	4.62	4.58	5.76	6.41	6.46	6.39	6.40	6.28	6.54	6.55
LSH-T3-540	Lichen	5.73	6.59	6.48	7.14	6.86	6.14	5.10		4.87	4.66	4.63	4.60	4.61	4.57	4.65	4.44	4.88	5.72
LSH-T4-20	0-21	4.46	4.92	5.30	5.20	5.79	5.49		5.46			5.77		5.23	5.17	4.53	4.46	4.93	5.27
	21-36	4.81	4.37	4.43	4.17	4.36	6.02	5.60	5.58	5.08	4.81	5.19	5.28	5.29	5.21	5.24	5.13	5.58	6.00
	36-44	5.38	4.81	4.91	4.88	4.77	4.79		5.05			4.89		4.81	4.78	4.49	4.44	5.53	6.04
LSH-T4-34	0-10	3.98	3.95	4.03	3.8	3.85	4.25	4.39	4.45	4.57	4.52	6.05	5.91	6.00	6.09	5.71	5.69	5.99	6.03
	10-22	4.82	4.25	4.17	4.26	4.25	6.06	5.04	5.03	4.69	4.66	5.32	5.59	5.73	5.46	5.78	5.57	6.00	6.18
	22-32	3.26	3.61	3.82	3.59	3.62	3.94	4.15	4.22	4.48	4.54	6.22	6.05	6.12	6.44	6.46	6.17	6.43	6.07
	32-44	4.35	3.91	4.02	3.85	3.86	4.38	4.88		4.81	4.51	5.16	5.08	5.02	5.14	5.78	6.18	6.45	6.11
Seahorse T3 Pond		5.64	5.28	4.10	4.70	5.35	5.31	5.29	5.76	6.14	6.24	6.44	6.18	6.39	6.41	6.32	6.25	6.43	6.24
HG South Pond		5.78	5.6	4.77	5.35	5.50	5.14		5.28			5.59		5.64	5.39	4.85	5.62	6.15	6.11
HG North Large Pond		5.78	5.8	4.97	4.81	4.59	5.68	4.75	4.59	4.51	4.56	5.49	6.07	6.12	5.84	6.28	6.02	6.48	6.48
HG North Small Pond		6.05	7.26	6.70	7.06	6.49	6.61	6.75	6.75	6.70	6.97	6.97	6.41	6.58	6.88	6.76	6.36	6.94	6.60
HG North Small Pond R		6.12	6.97	6.53	6.52	6.66	6.17	6.23	6.23	6.34	6.32	6.61	6.60	6.92	6.51	6.91	5.85	6.46	6.21

Jars with 2g of potato waste addition on September 18, 2001.

Jars with 5g of potato waste addition on June 10, 2002.

R: Replicates.

App1-Table 8b: Top Water Eh (mv)

Location	Depth (cm)	Before Potato Waste Addition					After Potato Waste Addition												
		in Fridge at 7 ^{o}C												in Room at 22 ^{o}C					
		11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01 PW addition	2-Oct-01	22-Oct-01	29-Oct-01	28-Nov-01	18-Dec-01	15-Apr-02	21-May-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
HG-T1-0	0-20	534	508	422	461	560	757	41	41	9	301	264	161	165	177	164	106	157	157
	20-32	554	484	433	520	542	775		428			401		315	379	-164	332	341	311
	32-71	528	517	463	490	546	771	404	404	363	360	548	396	416	460	409	387	262	380
	32-71 R	472	484	553	496	493	614	282	282	-59	101	384	280	320	369	277	318	329	319
HG-T1-50	0-4	548	471	435	490	515	715					372		397	432	-169	302	199	142
	4-60	607	469	408	473	486	472		360			318		343	390	-152	359	293	281
HG-T1-80	0-5	575	470	420	460	478	107	195	273	139	204	286	189	100	103	223	287	274	296
	5-6	565	457	433	517	500	456	286	393	139	169	281	207	153	88	89	87	109	330
	5-9	508	467	467	494	502	592					358		311	356	-179	309	269	86
	9-41	507	450	461	454	463	372		321			281		326	355	-156	300	312	305
HG-T1-100	0-4	517	454	525	483	508	554	95	316	150	159	282	257	223	218	77	85	135	202
	4-10	505	455	568	489	525	642		416			383		386	409	88	265	302	255
	10-18	515	456	538	474	496	536	73	317	139	128	335	287	280	268	87	80	140	261
	18-42	512	432	525	483	478	779		409			397		304	323	-120	253	209	176
	42-60	514	431	525	478	468	559		404			400		306	327	-145	330	268	220
HG-T1-150	0-4	547	457	597	493	510	727		430			412		386	440	-176	321	297	295
	4-6	526	457	583	493	493	672		420			418		398	425	-134	296	232	199
	6-11	533	440	562	479	476	573		391			304		372	396	15	291	286	211
	11-35	540	429	565	479	469	601	281	281	252	208	342	352	362	382	321	246	261	234
	11-35 R	532	429	737	477	493	625	17	17	166	340	395	374	374	291	206	156	198	155
	35-69	553	423	573	446	466	512	270	270	200	265	403	363	360	386	322	256	298	300
	35-69 R	536	409	732	482	494	570	-13	-13	239	247	322	249	249	142	127	146	161	248
HG-T1-200	0-1	686	586	652	471	561	641	187	187	56	133	331	154	121	102	126	147	217	317
	1-2	578	485	594	476	483	571		318			326		230	257	-98	324	342	244
	2-65	591	529	639	502	505	748		439			357		341	383	-164	267	206	164
HG-T1-250	0-5	590	486	622	490	502	500	41	31	18	299	395	278	237	226	39	41	140	247
	5-7	583	481	613	487	514	716		426			444		334	365	-78	303	294	217
	11-15	584	474	634	489	508	696		444			393		369	407	65	249	204	222
	15-26	587	460	599	463	482	716					365		336	359	-86	294	281	273
	26-38	574	453	602	496	470	586	-62	405	106	376	378	281	217	146	40	64	150	309
HG-T1-290	0-6	613	637	706	468	570	706	320	490	367	260	301	216	151	104	48	46	86	310
	6-10	604	642	705	515	499	751	368	480	42	14	392	214	197	181	140	116	70	202
	10-60	529	540	600	515	496	717	310	310	229	270	397	286	278	325	203	267	270	327
	10-60 R	525	469	595	482	533	-66	-54	-54	67	299	385	323	338	338	185	162	149	166
HG-T1-300	0-9	670	561	518	401	174	-4	235	235	102		392	293	206	196	157	158	189	290
	0-9 R	590	534	573	483	515	-340	156	156	200	165	332	334	128	151	146	161	159	275
	9-36	690	649	596	523	543	835	450	479	229	59	300	304	181	123	99	125	126	241
	37-40	699	695	646	524	604	401	355	511	396	372	503	449	461	468	401	477	494	470
	40-60	594	559	612	478	486	271					422		345	350	-24	324	295	340

App1-Table 8b: Top Water Eh (mv)

Location	Depth (cm)	Before Potato Waste Addition					After Potato Waste Addition												
		in Fridge at 7 ^{o}C												in Room at 22 ^{o}C					
		11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01 PW addition	2-Oct-01	22-Oct-01	29-Oct-01	28-Nov-01	18-Dec-01	15-Apr-02	21-May-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
HG-T2-0	0-10	590	510	583	458	437	-475	99	242	214	184	290	202	179	126	54	243	33	351
	10-27	567	465	599	460	464	608		428			447		282	259	15	327	255	205
	27-29	603	658	738	512	548	838		439			462		449	413	-29	278	224	224
	29-50	647	748	763	592	734	954	455	574	473	461	570	364	398	237	133	136	153	131
	50-57	703	739	747	637	770	1196		715			710		677	653	336	57	264	277
	57-65	673	710	799	550	719	716		581			663		623	593	75	209	275	272
	65-71	642	736	794	577	733	881		634			651		656	606	395	95	273	262
HG-T2-25	0-4	602	565	504	462	562	490		262			300		452	420	175	97	1	28
	4-10	568	518	483	477	546	-169	-143	337	-57	57	297	185	158	115	40	52	54	158
	10-48	574	502	517	474	535	403		481			297		260	199	33	291	248	196
	48-57	580	501	550	419	537	678		433			346		302	332	39	316	282	221
HG-T2-50	0-2	607	688	627	537	683	466	430	492	361	309	277	202	196	162	80	124	138	209
	2-10	507	585	610	463	585	540	-105	-105	-32	298	440	281	284	325	218	229	161	169
	10-38	510	565	658	496	561	533		300			484		359	336	-32	314	249	181
	38-65	529	521	658	484	539	835		326			420		361	351	-29	315	300	300
HG-T2-75	0-3	570	521	590	448	481	-360	164	224	147	184	197	149	140	65	-13	-16	24	240
	3-18	495	572	702	503	555	465	-110	377	29	165	244	209	205	127	72	13	112	189
	18-38	550	571	702	495	532	538	111	280	89	91	155	127	99	95	56	19	81	86
	38-52	481	573	645	424	561	508	327	360	20	80	193	98	79	90	77	72	17	126
	37-140	466	557	628	493	540	527	-87	327	-14	145	279	147	159	200	112	35	29	76
HG-T2-100	0-2	538	569	497	488	484	512		178			321		199	222	120	293	210	175
	2-24	608	554	566	487	522	535	-95	343	205	206	288	153	135	170	14	105	134	318
	25->	602	536	593	480	529	564		393			459		303	332	108	316	280	302
LSH-T3-50	0-1	619	601	662	529	598	387	15	347	91	130	295	193	151	99	-8	67	132	327
	1-3	571	560	683	477	551	376		287			433		312	330	170	304	254	208
	3-6	649	675	747	496	620	395	386	534	442	392	464	415	444	394	291	344	256	227
	6-15	627	663	619	506	610	501	315	313	-16	26	443	266	278	356	237	257	253	187
	15-28	559	544	562	486	525	359		303			450		295	286	48	293	279	189
	28-63	539	520	575	484	503	381		341			345		296	141	24	354	335	328
LSH-T3-75	0-14	572	375	591	486	499	55	178	401	162	164	392	216	209	108	-2	405	161	347
	14-24	586	495	702	508	580	391	259	348	90	291	314	202	183	88	25	89	144	363
	24-34	588	571	706	473	599	709	378	478	329	174	292	219	177	194	114	132	176	142
	34-40	562	567	737	503	585	305	-34		313	375	395	252	237	272	216	156	216	140
	40-63	521	485	689	489	533	676		345			429		288	270	108	347	316	338
	63-73	541	516	729	481	560	89	3	426	289	324	326	284	170	172	108	100	167	311
	73-78	534	471	701	457	526	781		405			387		240	227	28	280	291	299
	0-33	520	453	684	430	516	135	-69	350	19	106	311	236	217	171	28	63	164	225

App1-Table 8b: Top Water Eh (mv)

Location	Depth (cm)	Before Potato Waste Addition					After Potato Waste Addition												
		in Fridge at 7 ^{o}C												in Room at 22 ^{o}C					
		11-Aug-98	1-Dec-98	1-Dec-99	22-Aug-00	18-Sep-01 PW addition	2-Oct-01	22-Oct-01	29-Oct-01	28-Nov-01	18-Dec-01	15-Apr-02	21-May-02	22-May-02	3-Jun-02	19-Jun-02	11-Jul-02	25-Jul-02	18-Aug-02
LSH-T3-330	33-39	530	446	727	467	508	282		372			395		253	233	42	267	260	187
	39-72	523	491	787	489	551	400		404			520		382	387	29	279	233	195
LSH-T3-400	2-7	549	642	843	460	605	421	290	490	357	335	309	234	218	268	172	166	218	236
	7-52	562	519	694	504	525	629	-55	444	-106	335	358	238	208	191	108	124	228	267
LSH-T3-540	Lichen	541	516	707	488	500	-251	17		374	338	439	389	377	320	242	289	299	162
LSH-T4-20	0-21	624	542	785	479	540	445		433			372		381	346	-20	283	278	226
	21-36	620	555	811	514	583	270	299	328	285	168	383	330	304	288	209	236	249	236
	36-44	576	531	791	491	569	735		487			481		386	365	139	257	170	168
LSH-T4-34	0-10	535	631	787	517	613	772	328	493	388	372	345	280	239	169	159	163	158	167
	10-22	519	607	826	504	598	272	-30	369	-38	198	335	226	191	193	131	153	179	184
	22-32	700	680	860	544	645	865	409	493	474	418	291	213	193	131	6	79	127	174
	32-44	565	659	859	506	640	446	341		-53	-144	407	251	230	252	109	60	90	99
Seahorse T3 Pond		554	565	816	496	580	27	-45	254	148	173	174	173	177	140	407	125	175	233
HG South Pond		544	527	848	487	571	658		428			393		307	325	272	59	122	39
HG North Large Pond		536	508	815	470	598	-17	-59	371	316	339	273	237	183	179	122	111	209	222
HG North Small Pond		533	516	741	494	537	702	296	296	240	227	326	283	227	180	137	207	160	218
HG North Small Pond R		529	464	548	406	133	-340	168	167	181	203	94	57	79	98	86	73	139	256

Jars with 2g of potato waste addition on September 18, 2001.

Jars with 5g of potato waste addition on June 10, 2002.

R: Replicates.

App1-Table 7: Historic Activities of Beaker (Fridge-Room Temp) Experiment

Date	Activity	Analysis
23-Oct-98	Slurry (1hr and 17 hr) and then decant the supernatant aft the 17hr test was done	pH, Ni
17-Nov-98	Experiment Set Up	
	50 mL of Key Lake water was added to the remaining solid in each beaker, and placed in fridge at Ryerson University	
11-Jan-02	Top water monitoring and then the KLW supernatant was decanted. The decanted supernatant and 150ml of DH2O was added to each beaker, stired by hand for one minute. All the beakers were kept in room temp. (During the storage in the fridge at Ryerson, 28 beakers out of 67 were missing)	pH, Eh, Cond, T^{o}C, Acidity, Ni
14-Jan-02	top water monitoring and KLW supernatant was added back to each beaker	pH, Eh, Cond, ToC
15-Jan-02	top water monitoring and 2g of air-dried Potato Waste was added to each beaker.	pH, Eh, Cond, ToC, Acidity, Ni
21-Jan-02	top water monitoring.	pH, Eh, Cond, ToC
23-Jan-02	top water monitoring.	pH, Eh, Cond, ToC
24-Jan-02	top water monitoring.	NO_3-N
28-Jan-02	top water monitoring.	pH, Eh, Cond, ToC
4-Feb-02	top water monitoring.	pH, Eh, Cond, ToC, top water descriptioin
7-Feb-02	top water monitoring; 2g of air-dried Potato Waste addition to each beaker. Fe rust added to 29 beaker (which have lower [Fe] < 1.5%). 10 beakers which [Fe] 2-20% received 2g of PW, respectively.	pH, Eh, Cond, ToC, Acidity, Ni
11-Feb-02	top water monitoring.	pH, Eh, Cond, ToC
14-Feb-02	top water monitoring.	pH, Eh, Cond, ToC
19-Feb-02	top water monitoring.	pH, Eh, Cond, ToC, top water descriptioin
25-Feb-02	top water monitoring.	pH, Eh, Cond, ToC, top water descriptioin
4-Mar-02	top water monitoring.	pH, Eh, Cond, ToC, top water descriptioin
13-Mar-02	top water monitoring.	pH, Eh, Cond, ToC, top water descriptioin
20-Mar-02	top water monitoring.	pH, Eh, Cond, ToC, top water descriptioin
1-Apr-02	top water monitoring.	pH, Eh, Cond, ToC, top water descriptioin
7-May-02	top water monitoring. The beakers were dismissed and the experiment was completed.	pH, Eh, Cond, ToC, top water descriptioin

Table 4: pH in Beakers after mixing until end of experiment 7may 2002 at room temperature

Fe	Location	Depth (cm)	23-Oct-98 (Solid:DH_2O=1:1)		11-Jan-02 (Solid: KLW=1:1)[a]	Location	days aft expt set up	Before Potato Waste		Aft 2g of Potato Waste					Aft 2g of Potato Waste and Fe Rust								
mg.kg-1			1 hr	17 hrs				14-Jan-02 (Solid: DH_2O=1:3)[b]	15-Jan-02[c]	21-Jan-02	23-Jan-02	28-Jan-02	4-Feb-02	7-Feb-02	11-Feb-02[d]	14-Feb-02	19-Feb-02	25-Feb-02	4-Mar-02	13-Mar-02	20-Mar-02	1-Apr-02	7-May-02
								14-Jan-02	15-Jan-02	21-Jan-02	23-Jan-02	28-Jan-02	4-Feb-02	7-Feb-02	11-Feb-02	14-Feb-02	19-Feb-02	25-Feb-02	4-Mar-02	13-Mar-02	20-Mar-02	1-Apr-02	7-May-02
								1	2	7	9	14	21	24	28	31	36	42	49	58	65	77	113
2400	HG-T1-0	20-32	4.63	4.64	dry	HG-T1-0	20-32	4.79	4.69	4.39	4.18	4.13	4.43	4.41	4.26	4.55	4.70	4.81	5.09	5.39	5.94	6.23	6.35
410	HG-T1-50	4-60	5.48	5.43	6.50	HG-T1-50	4-60	6.12	6.54	4.17	4.08	3.91	3.95	3.89	4.25	4.45	4.56	4.82	5.81	6.25	6.64	7.15	8.10
5900	HG-T1-80	0-5	4.88	5.03	5.42	HG-T1-80	0-5	5.77	5.41	4.61	4.38	4.26	4.23	4.13	4.34	4.39	4.62	4.90	8.23	5.91	6.36	6.83	7.70
820		9-41	5.07	5.27	6.44		9-41	6.20	6.52	4.34	4.17	3.96	4.05	4.05	4.51	4.71	5.04	5.25	5.87	6.44	6.91	7.07	7.63
3800	HG-T1-100	0-4	4.54	4.86	4.60	HG-T1-100	0-4	5.25	4.75	4.71	4.15	4.25	4.35	4.29	4.56	4.72	4.97	5.00	5.35	5.96	6.68	7.21	7.53
2000		4-10	4.15	4.45	4.13		4-10	4.63	4.40	5.12	4.36	4.35	4.41	4.48	4.64	4.77	4.97	4.99	5.34	6.47	6.78	7.06	7.46
590		10-18	4.66	4.80	4.91		10-18	5.21	5.15	4.29	4.05	3.98	4.03	3.93	4.51	4.51	4.74	4.99	5.06	5.22	6.43	7.11	8.20
620		42-60	NA	NA	5.41		42-60	6.11	5.79	5.06	4.80	4.07	4.32	4.32	4.59	4.79	5.06	5.31	5.70	6.60	7.11	7.50	8.04
850	HG-T1-200	1-2	5.28	5.07	5.37	HG-T1-200	1-2	5.94	5.75	4.44	4.10	3.93	3.92	3.88	4.36	4.54	4.73	4.91	5.17	5.74	6.29	7.05	7.61
410	HG-T1-250	15-26	4.82	4.71	5.25	HG-T1-250	15-26	6.05	5.84	4.14	4.01	3.85	4.35	5.09	4.60	4.75	5.33	5.54	5.68	6.43	6.76	7.42	7.84
1000	HG-T1-290	10-60	4.59	4.31	4.62		10-60	5.04	4.93	4.49	4.18	3.98	4.00	3.90	4.31	4.53	4.92	5.26	5.33	6.47	6.91	7.06	7.87
650	HG-T1-300	40-60	5.17	4.98	5.22	HG-T1-300	40-60	5.61	5.65	4.44	4.07	3.92	4.45	5.22	4.85	5.41	5.33	5.59	6.32	7.02	7.20	7.36	7.72
5000		0-10	4.64	4.59	5.49		0-10	5.54	5.52	4.34	4.56	4.70	4.61	4.56	4.54	4.47	4.45	4.46	4.48	4.54	4.55	4.72	4.94
9000	HG-T2-0	27-29	3.86	3.86	3.93	HG-T2-0	27-29	4.26	2.92	4.42	4.33	4.30	4.38	4.30	4.45	4.46	4.63	4.87	4.98	5.28	5.30	5.73	6.97
3400		50-57	NA	NA	2.61		50-57	3.04	2.93	4.31	3.72	3.94	4.05	4.03	4.40	4.40	4.69	4.79	4.95	5.07	5.02	5.20	5.79
620	HG-T2-25	10-48	5.05	4.95	dry	HG-T2-25	10-48	5.51	5.63	4.04	3.97	3.99	4.72	4.86	4.83	4.97	5.29	6.15	6.92	7.32	7.48	7.77	8.36
1800		48-57	4.69	4.74	4.87		48-57	6.12	5.33	4.23	4.08	3.92	4.64	5.27	4.61	4.68	4.91	5.36	6.34	6.99	7.21	7.45	7.74
1200	HG-T2-50	10-38	4.09	3.85	4.30	HG-T2-50	10-38	5.40	4.71	5.37	5.38	4.03	4.21	4.76	4.70	4.82	5.60	5.61	6.20	6.88	6.92	7.36	7.64
2800		2-24	4.23	4.26	4.47		2-24	4.82	5.02	4.45	4.35	4.45	4.16	4.08	4.40	4.46	4.66	4.88	5.15	5.20	5.69	6.42	7.76
1300		25->	4.38	4.36	dry		25->	5.12	4.96	4.06	4.00	4.14	4.03	3.99	4.36	4.36	4.65	4.93	5.61	5.64	6.36	6.95	7.76
1500		1-3	4.16	4.11	3.97		1-3	4.46	4.27	4.96	4.39	4.44	4.21	4.17	4.37	4.35	4.57	4.82	5.04	5.33	5.50	6.13	7.82
4800	LSH-T3-50	6-15	3.42	3.47	3.84	LSH-T3-50	6-15	6.22	4.13	5.61	4.88	4.27	4.56	4.84	4.66	4.88	5.16	5.50	6.15	5.96	6.47	6.81	7.82
960		15-28	4.61	4.60	5.08		15-28	5.65	5.57	3.93	3.92	3.76	4.51	4.70	4.72	5.27	5.10	5.41	6.15	6.78	7.00	7.40	8.23
13400	LSH-T3-75	24-34	NA	NA	3.80		24-34	4.08	3.94	5.22	4.33	3.97	4.07	4.10	4.18	3.85	4.00	4.16	4.26	4.39	5.16	5.30	6.74
430		40-63	4.59	4.65	4.97		40-63	5.65	5.49	4.49	4.20	3.99	4.54	5.21	4.59	4.81	5.26	5.44	5.31	5.70	6.23	6.67	7.64
860	LSH-T3-330	0-33	4.78	4.96	5.00	LSH-T3-330	0-33	5.61	5.48	4.83	4.26	4.39	4.22	4.28	4.46	4.60	5.06	5.74	6.56	6.85	6.98	7.62	8.04
960		33-39	4.77	4.78	5.03		33-39	5.77	5.71	4.68	4.38	4.14	4.51	4.81	4.45	4.30	4.68	6.32	6.49	6.89	6.86	7.47	7.96
3800	LSH-T3-400	2-7	4.03	4.07	4.15	LSH-T3-400	2-7	4.59	4.36	4.15	3.99	4.80	4.66	4.82	4.62	4.84	5.28	6.23	6.59	6.93	7.19	7.70	8.17
3200	LSH-T4-34	10-22	3.72	3.73	dry	LSH-T4-34	10-22	4.18	4.15	5.34	4.96	4.29	4.95	5.28	4.67	4.89	5.14	5.34	5.88	6.82	6.98	7.58	8.28
44400	Seahorse T3 Pond		4.67	4.50	3.98	Seahorse T3 Pond		4.20	4.09	4.82	4.40	4.28	5.55	4.65	4.45	4.35	4.67	4.92	4.90	4.90	5.05	6.54	7.47
23700	HG-T1-150	4-6	4.70	4.83	5.07	HG-T1-150	4-6	5.35	5.10	5.01	5.19	4.48	4.68	4.73	4.33	4.33	4.72	5.13	5.58	6.00	5.85	6.54	7.35
112000	HG-T1-290	0-6	NA	NA	3.36		0-6	3.51	3.45	4.15	4.11	3.75	3.87	3.82	3.96	3.68	3.71	3.81	3.93	4.13	4.39	5.30	5.72
23600	HG-T2-0	10-27	4.96	5.03	dry		10-27	5.43	4.08	4.10	4.15	4.07	4.10	4.03	4.14	4.05	4.41	4.36	4.31	4.34	4.60	5.10	6.96
51900		0-3	2.27	2.27	2.90		0-3	3.13	3.04	3.48	3.59	3.34	4.00	4.28	4.61	4.72	4.93	5.27	5.56	6.21	6.54	6.79	7.39
224000	HG-T2-75	38-52	4.29	4.22	4.11	HG-T2-75	38-52	4.32	4.44	5.36	5.31	5.20	5.11	5.05	4.51	4.59	4.69	4.75	4.69	4.72	4.71	4.76	4.81
22300		37-140	4.64	4.42	4.23		37-140	5.55	4.50	4.65	4.81	4.82	5.19	5.30	4.68	4.85	5.14	5.30	5.35	5.59	5.71	5.83	6.80
145000	HG-T2-100	0-2	4.32	4.32	4.35		0-2	4.63	4.68	4.24	4.42	4.84	4.66	4.71	4.57	4.52	4.81	5.03	5.18	5.64	6.00	6.44	7.17
550	LSH-T3-50	28-63	4.70	4.77	dry		28-63	5.78	5.84	4.35	4.09	3.86	4.25	5.10	4.56	4.60	5.06	6.05	6.25	6.57	6.90	7.64	7.88
116000	LSH-T3-75	14-24	3.99	4.04	3.93		14-24	4.24	4.06	5.17	5.59	4.15	4.18	4.31	4.55	4.41	4.69	4.84	5.40	5.81	5.59	5.94	7.05
									no amendment	2	2.5												
										2	8.5												
									with 2g PW	7	2.5												
										7	8.5												
									with 4g PW & Rust	28	2.5												
										28	8.5												

[a] The supernatant of slurry from each beaker was decanted after 17-hoi [a] The supernatant of slurry from each beaker was decanted after 17-hour parameters determined on 23-Oct-98; 50 ml of Key Lake Water (KLW) was added to each beaker on 17-Nov-98, and then the beakers were placed in a fridge at 7 °C.

[b] The supernatant of slurry from each beaker was decanted after pH de [b] The supernatant of slurry from each beaker was decanted after pH determined on 11-Jan-02; 150 ml of DH_2O was added to each beaker on 11-Jan-02, and then the beakers were placed at room temperature (22 °C).

[c] After the supernatant obtained on 14-Jan-02 was then added back to [c] After the supernatant obtained on 14-Jan-02 was then added back to each beaker on 14-Jan-02).

[d] on 7-Feb-02, 2g of PW again was added to each beaker; Fe rust was [d] on 7-Feb-02, 2g of PW again was added to each beaker; Fe rust was added some beakers to reach 2% of sediment.

App1-Table 6: Historic Activitives of Jar-Fridge (7^{o}C) Experiment

Date	Activity	Analysis		Assayer#
		Boojum Lab	SRC Lab	
30-Jul-98	Experiment Set Up			
Before Potato Waste Addition				
11-Aug-98	20 ml top water collected	pH, Eh, Cond, ToC, Adidity, Alkalinity	Ni, Fe	7229 - 7333
1-Dec-98	20 ml top water collected	pH, Eh, Cond, ToC, Adidity, Alkalinity	Ni, Fe	7573 - 7675
1-Dec-99	25 ml top water collected	pH, Eh, Cond, ToC, qualitive description of water/sediment	Ni, Fe	8334 - 8435
22-Aug-00	20 ml top water collected	pH, Eh, Cond, ToC, qualitive description of water/sediment	Ni, Fe	9155 - 9257
18-Sep-01	20 ml top water collected	pH, Eh, Cond, ToC, Adidity	Ni, Fe	9468 - 9569
			ICP-25 + S shipped on 5-Jul-05	10724-10826
After Potation Addition				
2g of potato waste added to 54 jars on the 18-Sep-01				
2-Oct-01	no water collected	pH, Eh, Cond, ToC, qualitive description of water/sediment		
22-Oct-01	15 ml top and pore water collected from 16 jars	pH, Eh, Cond, ToC except Adidity only for the 16 jars		
29-Oct-01	20 ml top/pore water collected except the 16 jars	pH, Eh, Cond, ToC, Acidity, Ni qualitive description of water/sediment		
28-Nov-01	no water collected	pH, Eh, Cond, ToC qualitive description of water/sediment		
18-Dec-01	no water collected	pH, Eh, Cond, ToC qualitive description of water/sediment		
15-Apr-02	20 ml top water collected all jars were taken out of fridge and placed in room temp.	pH, Eh, Cond, ToC, Acidity, qualitive description of water/sediment		
21-May-02	no water collected	pH, Eh, Cond, ToC for 61 jars		
22-May-02	no water collected	pH, Eh, Cond, ToC		
3-Jun-02	no water collected	pH, Eh, Cond, ToC		
10-Jun-02	5 g of potato waste added to 39 jars (that did not receive any potato waste on 18-Sep-01)			
19-Jun-02	no water collected	pH, Eh, Cond, ToC		
11-Jul-02	no water collected	pH, Eh, Cond, ToC		
25-Jul-02	no water collected	pH, Eh, Cond, ToC		
18-Aug-02	50 ml top water collected. The qulitative description of the water were completed. The sediments were transferred into whirl packs and then placed in a freezer. The jars were dimissed and the expriment was completed.	pH, Eh, Cond, ToC, Acidity, Alkalilnity qualitive description of water/sediment	ICP-25 + S shipped on 5-Jul-05	10827-10929

App-1 Table 1: Historic Activities: Key Lake Column-Room (20°C) Experiment

Date	Activity		Analysis		Assayer#
	Top water	Pore water	Boojum Lab	SRC Lab	
20-Mar-99	Experiment Set Up (Eight Columns were set up in the basement without light)				
21-Mar-99 to 7-Apr-99	DH_2O was syphoned into each column from the surface.				
8-Apr-99		100 ml water sample was drained from the port at the bottom of each column	pH, Eh, Cond. Temp Acidity, Alka.	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	7740 -7747; 7748-7755;
24-Nov-99	Water was siphoned out and then DH_2O was siphoned into each column from the surface.	water sample was drained at the bottom of each column, two columns were dry out.	pH, Eh, Cond. Temp Acidity, Alka.	Same as above	8296-8301; 9778,9779, 9728-9731
26-Nov-99	Same as above		pH, Eh, Cond. Temp Acidity	Same as above	8302-8309; 9780, 9732-9738
20-Jan-00	Same as above		pH, Eh, Cond. Temp Acidity	Same as above	8436-8443 9739-9744
11-May-00	Same as above		pH, Eh, Cond. Temp Acidity	Same as above	9570-9577
22-Jun-00	Same as above		pH, Eh, Cond. Temp Acidity	Same as above	9578-9585
9-Aug-00	Same as above		pH, Eh, Cond. Temp Acidity	Same as above	9586-9593
29-Nov-00	Same as above		pH, Eh, Cond. Temp Acidity	Same as above	9594-9601
5-Oct-01	Same as above		pH, Eh, Cond. Temp Acidity	Same as above	9602-9609
7-Mar-02	Same as above	water sample was drained from the ports at each depth.	pH, Eh, Cond. Temp Acidity	Same as above	9745-9777
10-Sep-02	Same as above		pH, Eh, Cond. Temp Acidity		
15-Sep-03 to 16-Sep-03		water sample was drained from the ports at each depth.	pH, Eh, Cond. Temp Acidity		
18-Sep-03	The columns were disassembled and the experiment was completed.				
	Qualitative description of sediment, wet density, moisture content, slurry chemistry (pH, Eh, Cond. Temp Acidity,Ni)				
16-Mar-05	Analysis of the water samples collected on Sep 15-16, 2003			ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	10541-10576; 10577-10612
	Analysis of sediment samples collected on 18-Sep-03.			ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	10613-10649

Table 3b: Changes in Fe of Top Water, Key Lake Jar Experiment (7°C)

[Fe] in sediment

	Fe-PW ug/ml	Location	Depth (cm)	Solid wet wt. g/jar	ug/g	total mg/jar	11-Aug-98, 20mL top water collected ug/mL	11-Aug-98 total water vol. mL	1-Sep-98, 20mL top water collected ug/mL	1-Sep-98 total water vol. mL
No EDO		HG-T1-0	0-20	317	7600	2409	<0.3	700		
		HG-T1-0	32-71	246.5	470	116	<0.3	700		
		HG-T1-150	11-35	331	740	245	<0.3	700		
		HG-T1-150	35-69	289.5	1400	405	<0.3	700		
		HG-T1-200	1-2	267	850	227	<0.3	700		
		HG-T1-290	10-60	279	1000	279	<0.3	700	nr	680
		HG-T1-300	0-9	147.5	116000	17110	0.31	700		
		HG North Small Pond		385.5	64200	24749	<0.3	700		
2g EDO	0.367	HG-T1-0	32-71 R	246.5	470	116	<0.3	700		
	0.367	HG-T1-80	0-5	272	5900	1605	<0.3	700		
	0.367	HG-T1-80	5-6	261	13000	3393	<0.3	700		
	0.367	HG-T1-100	0-4	364	3800	1383	<0.3	700		
	0.367	HG-T1-100	10-18	295	590	174	<0.3	700		
	0.367	HG-T1-150	11-35 R	331	740	245	<0.3	700		
	0.367	HG-T1-150	35-69 R	289.5	1400	405	<0.3	700		
	0.367	HG-T1-200	0-1	379.5	24700	9374	0.46	700		
	0.367	HG-T1-250	0-5	373	870	325	<0.3	700		
	0.367	HG-T1-250	26-38	287.5	2700	776	<0.3	700		
	0.367	HG-T1-290	0-6	190	112000	21280	<0.3	700		
	0.367	HG-T1-290	6-10	238.4	9500	2265	<0.3	373.3		
	0.367	HG-T1-290	10-60 R	279	1000	279	<0.3	700		
	0.367	HG-T1-300	0-9 R	147.5	116000	17110	<0.3	700		
	0.367	HG-T1-300	9-36	188	134000	25192	<0.3	700		
	0.367	HG-T1-300	37-40	202.1	11800	2385	<0.3	373.3		
	0.367	HG-T2-0	0-10	223.5	5000	1118	<0.3	700		
	0.367	HG-T2-0	29-50	263.5	78400	20658	<0.3	700		
	0.367	HG-T2-25	4-10	298.5	3300	985	<0.3	700		
	0.367	HG-T2-50	0-2	234	165000	38610	<0.3	700	0.047	
	0.367	HG-T2-50	2-10	255.5	430	110	<0.3	700	0.002	
	0.367	HG-T2-75	0-3	144.5	51900	7500	<0.3	373.3		
	0.367	HG-T2-75	3-18	241	81200	19569	<0.3	700		
	0.367	HG-T2-75	18-38	161.3	224000	36131	<0.3	373.3		
	0.367	HG-T2-75	38-52	147.2	209000	30765	<0.3	373.3		
	0.367	HG-T2-75	37-140	173.9	22300	3878	<0.3	373.3		
	0.367	HG-T2-100	2-24	303	2800	848	<0.3	700		
	0.367	LSH-T3-50	0-1	271.5	32600	8851	<0.3	700		
	0.367	LSH-T3-50	3-6	196	8500	1666	<0.3	700		
	0.367	LSH-T3-50	6-15	228	4800	1094	<0.3	373.3		
	0.367	LSH-T3-75	0-14	110.5	50400	5569	<0.3	700		
	0.367	LSH-T3-75	14-24	218.5	116000	25346	<0.3	700		
	0.367	LSH-T3-75	24-34	229	13400	3069	<0.3	700		
	0.367	LSH-T3-75	34-40	212.6	5200	1106	<0.3	296		
	0.367	LSH-T3-75	63-73	323	3200	1034	<0.3	700		
	0.367	LSH-T3-330	0-33	339	860	292	<0.3	700		
	0.367	LSH-T3-400	2-7	314	3800	1193	<0.3	700		
	0.367	LSH-T3-400	7-52	304.5	1000	305	<0.3	700		
	0.367	LSH-T3-540	Lichen	99.7	3500	349	<0.3	373.3		
	0.367	LSH-T4-20	21-36	259.5	1300	337	<0.3	700		
	0.367	LSH-T4-34	0-10	170.5	66000	11253	<0.3	700	0.37	
	0.367	LSH-T4-34	10-22	261	3200	835	<0.3	700	0.055	
	0.367	LSH-T4-34	22-32	220	12600	2772	<0.3	700	0.72	
	0.367	LSH-T4-34	32-44	205.1	7500	1538	<0.3	373.3		
	0.367	Seahorse T3 Pond		388.5	44400	17249	<0.3	700		
	0.367	HG North Large Pond		400	690	276	<0.3	700		
	0.367	HG North Small Pond R		385.5	64200	24749	<0.3	700		

Table 3b: Changes in Fe of Top Water, Key Lake Jar Experiment (7°C) Continued

[Fe] in sediment

	Fe-PW ug/ml	Location	Depth (cm)	Solid wet wt. g/jar	ug/g	total mg/jar	11-Aug-98, 20mL top water collected ug/mL	11-Aug-98, 20mL top water collected total water vol. mL	1-Sep-98, 20mL top water collected ug/mL	1-Sep-98, 20mL top water collected total water vol. mL
5g EDO	0.367	HG-T1-0	20-32	141	2400	338	<0.3	700		
	0.367	HG-T1-50	0-4	258	23800	6140	<0.3	700		
	0.367	HG-T1-50	4-60	354.5	410	145	<0.3	700		
	0.367	HG-T1-80	5-9	287.5	16900	4859	<0.3	700		
	0.367	HG-T1-80	9-41	385	820	316	<0.3	700		
	0.367	HG-T1-100	4-10	295.5	2000	591	<0.3	700		
	0.367	HG-T1-100	18-42	331.5	910	302	<0.3	700		
	0.367	HG-T1-100	42-60	348.5	620	216	<0.3	700		
	0.367	HG-T1-150	0-4	333	19100	6360	<0.3	700		
	0.367	HG-T1-150	4-6	335.5	23700	7951	<0.3	700		
	0.367	HG-T1-150	6-11	336	2100	706	<0.3	700		
	0.367	HG-T1-200	2-65	324.5	13000	4219	<0.3	700		
	0.367	HG-T1-250	5-7	364	690	251	<0.3	700		
	0.367	HG-T1-250	11-15	297.5	2200	655	<0.3	700		
	0.367	HG-T1-250	15-26	263.5	410	108	<0.3	700		
	0.367	HG-T1-300	40-60	299	650	194	<0.3	700		
	0.367	HG-T2-0	10-27	298.5	23600	7045	<0.3	700		
	0.367	HG-T2-0	27-29	241.5	9000	2174	<0.3	700		
	0.367	HG-T2-0	50-57	198	3400	673	1.0	700		
	0.367	HG-T2-0	57-65	307.5	1400	431	0.35	700		
	0.367	HG-T2-0	65-71	285	9500	2708	<0.3	700		
	0.367	HG-T2-25	0-4	229	38900	8908	<0.3	700		
	0.367	HG-T2-25	10-48	318	620	197	<0.3	700		
	0.367	HG-T2-25	48-57	326	1800	587	<0.3	700		
	0.367	HG-T2-50	10-38	285	1200	342	<0.3	700	0.009	
	0.367	HG-T2-50	38-65	300.5	670	201	<0.3	700	0.003	
	0.367	HG-T2-100	0-2	185.9	145000	26956	<0.3	373.3		
	0.367	HG-T2-100	25->	350	1300	455	<0.3	700		
	0.367	LSH-T3-50	1-3	140.3	1500	210	<0.3	373.3		
	0.367	LSH-T3-50	15-28	314.5	960	302	<0.3	700		
	0.367	LSH-T3-50	28-63	307	550	169	<0.3	700		
	0.367	LSH-T3-75	40-63	287	430	123	<0.3	700		
	0.367	LSH-T3-75	73-78	311.5	660	206	<0.3	700		
	0.367	LSH-T3-330	33-39	313.5	960	301	<0.3	700		
	0.367	LSH-T3-330	39-72	320.5	3300	1058	<0.3	700		
	0.367	LSH-T4-20	0-21	144	46800	6739	<0.3	700		
	0.367	LSH-T4-20	36-44	314	8500	2669	<0.3	700		
	0.367	HG South Pond		273.5	72500	19829	<0.3	700		

	Table 3b: Changes in Fe of Top Water, Key Lake Jar Experiment (7°C) Continued											
	[Fe] in sediment											
	1-Dec-98, 20mL top water collected			1-Dec-99, 25mL top water collected			22-Aug-00, 20mL top water collected			18-Sep-01, 20mL top water collected		
	ug/mL	total water vol. mL	tot-Fe in water, ug/jar	ug/mL	total water vol. mL	tot-Fe in water, ug/jar	ug/mL	total water vol. mL	tot-Fe in water, ug/jar	ug/mL	total water vol. mL	tot-Fe in water, ug/jar
	0.032	680	21.76	0.062	660	40.92	0.21	635	133.35	0.048	615	29.52
	0.05	680	34.0	0.062	660	40.92	0.086	635	54.61	0.063	615	38.745
	0.009	680	6.12	0.022	660	14.52	0.019	635	12.065	0.008	615	4.92
	0.009	680	6.12	0.015	660	9.9	0.01	635	6.35	0.011	615	6.765
	0.048	680	32.64	0.035	660	23.1	0.036	635	22.86	0.003	615	1.845
	0.008	660	5.28	0.031	640	19.84	0.033	615	20.295	0.093	595	55.335
	1.8	680	1224	68	660	44880	10	635	6350	52	615	31980
	0.24	680	163.2	0.056	660	36.96	0.025	635	15.875	0.001	615	0.615
	0.049	680	33.32	0.1	660	66	0.089	635	56.515	0.17	615	104.55
	0.16	680	108.8	0.072	660	47.52	0.061	635	38.735	0.054	615	33.21
	0.065	680	44.2	0.014	660	9.24	0.01	635	6.35	0.008	615	4.92
	0.06	680	40.8	0.014	660	9.24	0.026	635	16.51	0.011	615	6.765
	0.057	680	38.76	0.047	660	31.02	0.045	635	28.575	0.014	615	8.61
	0.014	680	9.52	0.009	660	5.94	0.021	635	13.335	0.002	615	1.23
	0.015	680	10.2	0.009	660	5.94	0.031	635	19.685	0.012	615	7.38
	0.03	680	20.4	0.008	660	5.28	0.025	635	15.875	0.005	615	3.075
	0.041	680	27.88	0.032	660	21.12	0.022	635	13.97	0.006	615	3.69
	0.009	680	6.12	0.016	660	10.56	0.022	635	13.97	0.004	615	2.46
	0.069	680	46.92	0.071	660	46.86	0.09	635	57.15	0.084	615	51.66
	0.027	353.3	9.5391	0.052	333.3	17.3316	0.039	308.3	12.0237	0.032	288.3	9.2256
	0.012	680	8.16	0.083	660	54.78	0.024	635	15.24	0.01	615	6.15
	0.073	680	49.64	66	660	43560	12	635	7620	3.7	615	2275.5
	0.077	680	52.36	0.43	660	283.8	0.2	635	127	0.33	615	202.95
	0.29	353.3	102.457	0.32	333.3	106.656	0.25	308.3	77.075	0.25	288.3	72.075
	22	680	14960	44	660	29040	44	635	27940	37	615	22755
	1.4	680	952	1.8	660	1188	2.1	635	1333.5	2	615	1230
	0.057	680	38.76	0.059	660	38.94	0.018	635	11.43	0.006	615	3.69
	0.19	660	125.4	0.28	640	179.2	0.27	615	166.05	0.25	595	148.75
	0.006	660	3.96	0.029	640	18.56	0.022	615	13.53	0.012	595	7.14
	0.12	353.3	42.396	72	333.3	23997.6	46	308.3	14181.8	10	288.3	2883
	0.013	680	8.84	0.049	660	32.34	0.097	635	61.595	0.019	615	11.685
	0.009	353.3	3.1797	0.084	333.3	27.9972	0.028	308.3	8.6324	0.012	288.3	3.4596
	0.019	353.3	6.7127	0.027	333.3	8.9991	0.03	308.3	9.249	0.025	288.3	7.2075
	0.009	353.3	3.1797	0.01	333.3	3.333	0.012	308.3	3.6996	0.002	288.3	0.5766
	0.007	680	4.76	0.053	660	34.98	0.074	635	46.99	0.007	615	4.305
	0.028	680	19.04	0.052	660	34.32	0.037	635	23.495	0.051	615	31.365
	0.11	680	74.8	0.12	660	79.2	0.19	635	120.65	0.11	615	67.65
	0.043	353.3	15.1919	0.068	333.3	22.6644	0.054	308.3	16.6482	0.03	288.3	8.649
	27	680	18360	22	660	14520	16	635	10160	8.1	615	4981.5
	0.05	680	34	0.052	660	34.32	0.031	635	19.685	0.019	615	11.685
	0.05	680	34	0.05	660	33	0.042	635	26.67	0.021	615	12.915
	0.015	276	4.14	0.029	256	7.424	0.038	231	8.778	0.014	211	2.954
	0.006	680	4.08	0.023	660	15.18	0.086	635	54.61	0.011	615	6.765
	0.036	680	24.48	0.052	660	34.32	0.072	635	45.72	0.013	615	7.995
	0.054	680	36.72	0.052	660	34.32	0.053	635	33.655	0.039	615	23.985
	0.018	680	12.24	0.03	660	19.8	0.021	635	13.335	0.009	615	5.535
	7.1	353.3	2508.43	11	333.3	3666.3	8.3	308.3	2558.89	12	288.3	3459.6
	0.17	680	115.6	0.18	660	118.8	0.23	635	146.05	0.2	615	123
	0.058	660	38.28	0.07	640	44.8	0.083	615	51.045	0.065	595	38.675
	0.022	660	14.52	0.045	640	28.8	0.052	615	31.98	0.023	595	13.685
	0.17	660	112.2	0.16	640	102.4	0.18	615	110.7	0.16	595	95.2
	0.032	353.3	11.3056	0.054	333.3	17.9982	0.044	308.3	13.5652	0.042	288.3	12.1086
	0.01	680	6.8	0.022	660	14.52	0.016	635	10.16	0.004	615	2.46
	0.009	680	6.12	0.015	660	9.9	0.039	635	24.765	0.008	615	4.92
	0.057	680	38.76	0.097	660	64.02	0.77	635	488.95	3	615	1845

Table 3b: Changes in Fe of Top Water, Key Lake Jar Experiment (7°C) Continued

[Fe] in sediment

1-Dec-98, 20mL top water collected			1-Dec-99, 25mL top water collected			22-Aug-00, 20mL top water collected			18-Sep-01, 20mL top water collected		
ug/mL	total water vol. mL	tot-Fe in water, ug/jar	ug/mL	total water vol. mL	tot-Fe in water, ug/jar	ug/mL	total water vol. mL	tot-Fe in water, ug/jar	ug/mL	total water vol. mL	tot-Fe in water, ug/jar
0.2	680	136	1.5	660	990	4.00	635	2540	2.1	615	1291.5
0.046	680	31.28	0.02	660	13.2	0.018	635	11.43	0.011	615	6.765
0.023	680	15.64	0.021	660	13.86	0.009	635	5.715	0.007	615	4.305
nr	680	nr	0.013	660	8.58	0.013	635	8.255	0.009	615	5.535
0.009	680	6.12	0.011	660	7.26	0.015	635	9.525	0.008	615	4.92
0.038	680	25.84	0.032	660	21.12	0.045	635	28.575	0.016	615	9.84
0.008	680	5.44	0.011	660	7.26	0.012	635	7.62	0.008	615	4.92
0.014	680	9.52	0.009	660	5.94	0.009	635	5.715	0.008	615	4.92
0.49	680	333.2	0.032	660	21.12	0.02	635	12.7	0.007	615	4.305
0.006	680	4.08	0.049	660	32.34	0.019	635	12.065	0.009	615	5.535
0.012	680	8.16	0.025	660	16.5	0.019	635	12.065	0.001	615	0.615
0.011	680	7.48	0.021	660	13.86	0.015	635	9.525	0.004	615	2.46
0.015	680	10.2	0.016	660	10.56	0.007	635	4.445	0.006	615	3.69
0.023	680	15.64	0.036	660	23.76	0.055	635	34.925	0.005	615	3.075
0.021	680	14.28	0.015	660	9.9	0.08	635	50.8	0.01	615	6.15
0.01	680	6.8	0.047	660	31.02	0.015	635	9.525	0.006	615	3.69
0.095	680	64.6	0.071	660	46.86	0.071	635	45.085	0.036	615	22.14
0.016	680	10.88	0.076	660	50.16	0.019	635	12.065	0.015	615	9.225
3.7	680	2516	6	660	3960	8.2	635	5207	7.5	615	4612.5
0.51	680	346.8	0.52	660	343.2	0.44	635	279.4	0.53	615	325.95
0.64	680	435.2	0.74	660	488.4	0.8	635	508	0.71	615	436.65
1.6	680	1088	28	660	18480	16	635	10160	0.023	615	14.145
0.008	680	5.44	0.08	660	52.8	0.009	635	5.715	0.008	615	4.92
0.011	680	7.48	0.025	660	16.5	0.002	635	1.27	0.016	615	9.84
0.005	660	3.3	0.013	640	8.32	0.008	615	4.92	0.012	595	7.14
0.009	660	5.94	0.021	640	13.44	0.01	615	6.15	0.009	595	5.355
0.016	353.3	5.6528	22	333.3	7332.6	28	308.3	8632.4	2.1	288.3	605.43
0.005	680	3.4	0.057	660	37.62	0.045	635	28.575	0.006	615	3.69
0.022	353.3	7.7726	0.038	333.3	12.6654	0.033	308.3	10.1739	0.022	288.3	6.3426
0.014	680	9.52	0.056	660	36.96	0.019	635	12.065	0.004	615	2.46
0.007	680	4.76	0.019	660	12.54	0.014	635	8.89	0.001	615	0.615
0.011	680	7.48	0.014	660	9.24	0.013	635	8.255	0.005	615	3.075
0.011	680	7.48	0.012	660	7.92	0.23	635	146.05	0.007	615	4.305
0.045	680	30.6	0.032	660	21.12	0.032	635	20.32	0.005	615	3.075
0.009	680	6.12	0.022	660	14.52	0.02	635	12.7	0.012	615	7.38
0.12	680	81.6	0.16	660	105.6	0.19	635	120.65	0.24	615	147.6
0.012	680	8.16	0.058	660	38.28	0.018	635	11.43	0.007	615	4.305
0.013	680	8.84	0.07	660	46.2	0.02	635	12.7	0.012	615	7.38

Table 3b: Changes in Fe of Top Water, Key Lake Jar Experiment (7°C) Continued

[Fe] in sediment

18-Sep-01	22-Oct-01	29-Oct-01	15-Apr-02	10-Jun-02	18-Aug-02, 50mL top water collected ug/mL	total water vol. mL	tot-Fe in water, ug/jar	tot-Fe in water of control jars, ug/jar	Reduction of Fe from EDO ug/jar	Fe changes with concern EDO (Fe_{2002}-Fe_{1998}), mg/jar
2g of Potato Waste was added to 54 jars (in yellow hight light), respectively after 20mL top water was collected for chemistry analysis.	15mL top water collected	20mL pore water collected	20mL top water collected	5g of Potato Waste was added to another 39 jars (in green hight light), respectively.				Fe change ug/jar/d		
					125	535	66875.0	49.3		66853.2
					0.098	535	52.4	0.014		18.4
					0.027	535	14.4	0.006		8.3
					0.022	535	11.8	0.004		5.7
					0.17	535	91.0	0.043		58.3
					0.093	515	47.9	0.031		42.6
					22.8	535	12198.0	8.093		10974.0
					0.076	535	40.7	-0.090		-122.5
					nr	535				nr
					0.079	535	42.3	196.345	-154.08	87.545
					0.44	535	235.4	196.345	39.06	152.145
					15	535	8025.0	196.345	7828.66	155.545
					0.73	535	390.6	196.345	194.21	157.585
					4.37	535	2338.0	196.345	2141.61	186.825
					0.08	535	42.8	196.345	-153.55	186.145
					0.046	535	24.6	196.345	-171.74	175.945
					2.81	535	1503.4	196.345	1307.01	168.465
					0.76	535	406.6	196.345	210.26	190.225
					44.4	535	23754.0	196.345	23557.66	149.425
					0.063	208.3	13.1	76.446	-63.32	66.907
					3.5	535	1872.5	196.345	1676.16	188.185
					8.77	535	4692.0	196.345	4495.61	146.705
					53.6	535	28676.0	196.345	28479.66	143.985
					49.1	208.3	10227.5	76.446	10151.08	-26.011
					3.6	535	1926.0	196.345	1729.66	-14763.655
					57.1	535	30548.5	196.345	30352.16	-755.655
					0.84	535	449.4	196.345	253.06	157.585
					17.7	515	9115.5	189.005	8926.50	63.605
					3.18	515	1637.7	189.005	1448.70	185.045
					26.1	208.3	5436.6	76.446	5360.18	34.050
					15.6	535	8346.0	196.345	8149.66	187.505
					86.2	208.3	17955.5	76.446	17879.01	73.266
					7.38	208.3	1537.3	76.446	1460.81	69.733
					31.9	208.3	6644.8	76.446	6568.32	73.266
					1.58	535	845.3	196.345	648.96	191.585
					44.3	535	23700.5	196.345	23504.16	177.305
					76.6	535	40981.0	196.345	40784.66	121.545
					45.1	208.3	9394.3	76.446	9317.88	61.254
					19.4	535	10379.0	196.345	10182.66	-18163.655
					10	535	5350.0	196.345	5153.66	162.345
					67.7	535	36219.5	196.345	36023.16	162.345
					160	131	20960.0	48.077	20911.92	43.937
					2.1	535	1123.5	196.345	927.16	192.265
					11.4	535	6099.0	196.345	5902.66	171.865
					3.87	535	2070.5	196.345	1874.11	159.625
					2.61	535	1396.4	196.345	1200.01	184.105
					107	208.3	22288.1	76.446	22211.65	-2431.984
					43.3	535	23165.5	196.345	22969.16	80.745
					133	515	68495.0	189.005	68306.00	150.725
					104	515	53560.0	189.005	53371.00	174.485
					15.8	515	8137.0	189.005	7948.00	76.805
					50.6	208.3	10540.0	76.446	10463.53	65.140
					0.34	535	181.9	196.345	-14.45	189.545
					0.27	535	144.5	196.345	-51.90	190.225
					nr	535	nr	196.345	nr	nr

Table 3b: Changes in Fe of Top Water, Key Lake Jar Experiment (7°C) Continued

[Fe] in sediment

18-Sep-01	22-Oct-01	29-Oct-01	15-Apr-02	10-Jun-02	18-Aug-02, 50mL top water collected: ug/mL	total water vol. mL	tot-Fe in water, ug/jar	tot-Fe in water of control jars, ug/jar	Reduction of Fe from EDO ug/jar	Fe changes with concern EDO (Fe_{2002}-Fe_{1998}), mg/jar
2g of Potato Waste was added to 54 jars (in yellow hight light), respectively after 20mL top water was collected for chemistry analysis.	15mL top water collected	20mL pore water collected	20mL top water collected	5g of Potato Waste was added to another 39 jars (in green hight light), respectively.	25.1	535	13428.5	196.345	13232.16	60.345
					47.2	535	25252.0	196.345	25055.66	165.065
					25.9	535	13856.5	196.345	13660.16	180.705
					91.2	535	48792.0	196.345	48595.66	nr
					30.3	535	16210.5	196.345	16014.16	190.225
					63.6	535	34026.0	196.345	33829.66	170.505
					11.5	535	6152.5	196.345	5956.16	190.905
					19.8	535	10593.0	196.345	10396.66	186.825
					63.8	535	34133.0	196.345	33936.66	-136.855
					5	535	2675.0	196.345	2478.66	192.265
					17.6	535	9416.0	196.345	9219.66	188.185
					34.9	535	18671.5	196.345	18475.16	188.865
					26.1	535	13963.5	196.345	13767.16	186.145
					0.87	535	465.5	196.345	269.11	180.705
					2.94	535	1572.9	196.345	1376.56	182.065
					24.8	535	13268.0	196.345	13071.66	189.545
					53.6	535	28676.0	196.345	28479.66	131.745
					283	535	151405.0	196.345	151208.66	185.465
					102	535	54570.0	196.345	54373.66	-2319.655
					55.9	535	29906.5	196.345	29710.16	-150.455
					265	535	141775.0	196.345	141578.66	-238.855
					0.17	535	91.0	196.345	-105.40	-891.655
					16.5	535	8827.5	196.345	8631.16	190.905
					4.16	535	2225.6	196.345	2029.26	188.865
					14.1	515	7261.5	189.005	7072.50	185.705
					31.6	515	16274.0	189.005	16085.00	183.065
					891	208.3	185595.3	76.446	185518.85	70.793
					54.9	535	29371.5	196.345	29175.16	192.945
					213	208.3	44367.9	76.446	44291.45	68.674
					21	535	11235.0	196.345	11038.66	186.825
					19.4	535	10379.0	196.345	10182.66	191.585
					45.5	535	24342.5	196.345	24146.16	188.865
					42.9	535	22951.5	196.345	22755.16	188.865
					8.75	535	4681.3	196.345	4484.91	165.745
					9.42	535	5039.7	196.345	4843.36	190.225
					412	535	220420.0	196.345	220223.66	114.745
					105	535	56175.0	196.345	55978.66	188.185
					195	535	104325.0	196.345	104128.66	187.505

Table 3a: Changes in Ni of Top Water, Key Lake Jar Experiment (7°C)

[Ni] in sediment

	Ni-PW ug/ml	Location	Depth (cm)	Solid wet wt. g/jar	ug/g	total mg/jar	11-Aug-98, 20mL top water collected ug/mL	11-Aug-98 total water vol. mL	11-Aug-98 tot-Ni released to water, ug/jar	1-Sep-98, 20mL top water collected ug/mL	1-Sep-98 total water vol. mL	1-Sep-98 tot-Ni released to water, ug/jar
No EDO		HG-T1-0	0-20	317	5.7	1.81	0.026	700	18.2			
		HG-T1-0	32-71	246.5	6.8	1.68	0.015	700	10.5			
		HG-T1-150	11-35	331	0.7	0.23	0.017	700	11.9			
		HG-T1-150	35-69	289.5	0.7	0.20	0.006	700	4.2			
		HG-T1-200	1-2	267	0.8	0.21	0.007	700	4.9			
		HG-T1-290	10-60	279	0.8	0.22	nr	700	nr	nr	680	nr
		HG-T1-300	0-9	147.5	140	20.65	0.22	700	154			
		HG North Small Pond		385.5	110	42.41	0.23	700	161			
2g EDO	0.007	HG-T1-0	32-71 R	246.5	6.8	1.68	0.019	700	13.3			
	0.007	HG-T1-80	0-5	272	3.9	1.06	0.016	700	11.2			
	0.007	HG-T1-80	5-6	261	34	8.87	0.006	700	4.2			
	0.007	HG-T1-100	0-4	364	2.8	1.02	0.008	700	5.6			
	0.007	HG-T1-100	10-18	295	1	0.30	0.004	700	2.8			
	0.007	HG-T1-150	11-35 R	331	0.7	0.23	0.016	700	11.2			
	0.007	HG-T1-150	35-69 R	289.5	0.7	0.20	0.006	700	4.2			
	0.007	HG-T1-200	0-1	379.5	10	3.80	0.36	700	252			
	0.007	HG-T1-250	0-5	373	<0.5	0.19	0.006	700	4.2			
	0.007	HG-T1-250	26-38	287.5	0.6	0.17	0.003	700	2.1			
	0.007	HG-T1-290	0-6	190	50	9.50	0.095	700	66.5			
	0.007	HG-T1-290	6-10	238.4	8.9	2.12	0.052	373.3	19.4116			
	0.007	HG-T1-290	10-60 R	279	0.8	0.22	0.01	700	7			
	0.007	HG-T1-300	0-9 R	147.5	140	20.65	0.17	700	119			
	0.007	HG-T1-300	9-36	188	96	18.05	0.63	700	441			
	0.007	HG-T1-300	37-40	202.1	15	3.03	0.37	373.3	138.121			
	0.007	HG-T2-0	0-10	223.5	4.4	0.98	0.01	700	7			
	0.007	HG-T2-0	29-50	263.5	4.1	1.08	0.006	700	4.2			
	0.007	HG-T2-25	4-10	298.5	4.9	1.46	0.026	700	18.2			
	0.007	HG-T2-50	0-2	234	76	17.78	0.047	700	32.9	0.047	680	31.96
	0.007	HG-T2-50	2-10	255.5	<0.5	0.13	0.002	700	1.4	0.002	680	1.36
	0.007	HG-T2-75	0-3	144.5	130	18.79	1.3	373.3	485.29			
	0.007	HG-T2-75	3-18	241	120	28.92	0.43	700	301			
	0.007	HG-T2-75	18-38	161.3	330	53.23	0.45	373.3	167.985			
	0.007	HG-T2-75	38-52	147.2	210	30.91	0.2	373.3	74.66			
	0.007	HG-T2-75	37-140	173.9	30	5.22	0.35	373.3	130.655			
	0.007	HG-T2-100	2-24	303	1.8	0.55	0.076	700	53.2			
	0.007	LSH-T3-50	0-1	271.5	66	17.92	0.41	700	287			
	0.007	LSH-T3-50	3-6	196	54	10.58	1.2	700	840			
	0.007	LSH-T3-50	6-15	228	10	2.28	0.33	373.3	123.189			
	0.007	LSH-T3-75	0-14	110.5	150	16.58	0.075	700	52.5			
	0.007	LSH-T3-75	14-24	218.5	320	69.92	0.99	700	693			
	0.007	LSH-T3-75	24-34	229	150	34.35	1.4	700	980			
	0.007	LSH-T3-75	34-40	212.6	19	4.04	0.54	296	159.84			
	0.007	LSH-T3-75	63-73	323	7.7	2.49	0.19	700	133			
	0.007	LSH-T3-330	0-33	339	3.6	1.22	0.006	700	4.2			
	0.007	LSH-T3-400	2-7	314	16	5.02	0.23	700	161			
	0.007	LSH-T3-400	7-52	304.5	21	6.39	0.052	700	36.4			
	0.007	LSH-T3-540	Lichen	99.7	31	3.09	0.07	373.3	26.131			
	0.007	LSH-T4-20	21-36	259.5	9.7	2.52	0.086	700	60.2			
	0.007	LSH-T4-34	0-10	170.5	96	16.37	0.37	700	259	0.37	680	251.6
	0.007	LSH-T4-34	10-22	261	9.3	2.43	0.055	700	38.5	0.055	680	37.4
	0.007	LSH-T4-34	22-32	220	32	7.04	0.72	700	504	0.72	680	489.6
	0.007	LSH-T4-34	32-44	205.1	7.1	1.46	0.13	373.3	48.529			
	0.007	Seahorse T3 Pond		388.5	200	77.70	0.01	700	7			
	0.007	HG North Large Pond		400	5.2	2.08	0.032	700	22.4			
	0.007	HG North Small Pond R		385.5	110	42.41	0.014	700	9.8			

Table 3a: Changes in Ni of Top Water, Key Lake Jar Experiment (7°C) Continued

[Ni] in sediment

	Ni-PW ug/ml	Location	Depth (cm)	Solid wet wt. g/jar	ug/g	total	11-Aug-98, 20mL top water collected			1-Sep-98, 20mL top water collected		
						mg/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar
5g EDO	0.007	HG-T1-0	20-32	141	26	3.67	0.008	700	5.6			
	0.007	HG-T1-50	0-4	258	3.6	0.93	0.002	700	1.4			
	0.007	HG-T1-50	4-60	354.5	0.8	0.28	0.002	700	1.4			
	0.007	HG-T1-80	5-9	287.5	9.3	2.67	0.003	700	nr			
	0.007	HG-T1-80	9-41	385	<0.5	0.19	0.02	700	14			
	0.007	HG-T1-100	4-10	295.5	4.1	1.21	0.005	700	3.5			
	0.007	HG-T1-100	18-42	331.5	0.7	0.23	0.004	700	2.8			
	0.007	HG-T1-100	42-60	348.5	<0.5	0.17	0.004	700	2.8			
	0.007	HG-T1-150	0-4	333	9.2	3.06	0.004	700	2.8			
	0.007	HG-T1-150	4-6	335.5	15	5.03	0.002	700	1.4			
	0.007	HG-T1-150	6-11	336	2.4	0.81	0.012	700	8.4			
	0.007	HG-T1-200	2-65	324.5	13	4.22	0.084	700	58.8			
	0.007	HG-T1-250	5-7	364	0.8	0.29	0.004	700	2.8			
	0.007	HG-T1-250	11-15	297.5	0.6	0.18	0.002	700	1.4			
	0.007	HG-T1-250	15-26	263.5	<0.5	0.13	0.003	700	2.1			
	0.007	HG-T1-300	40-60	299	0.6	0.18	0.009	700	6.3			
	0.007	HG-T2-0	10-27	298.5	2.7	0.81	0.001	700	0.7			
	0.007	HG-T2-0	27-29	241.5	2.2	0.53	0.001	700	0.7			
	0.007	HG-T2-0	50-57	198	0.7	0.14	0.006	700	4.2			
	0.007	HG-T2-0	57-65	307.5	0.9	0.28	0.005	700	3.5			
	0.007	HG-T2-0	65-71	285	0.6	0.17	0.008	700	5.6			
	0.007	HG-T2-25	0-4	229	39	8.93	0.028	700	19.6			
	0.007	HG-T2-25	10-48	318	0.8	0.25	0.017	700	11.9			
	0.007	HG-T2-25	48-57	326	0.7	0.23	0.01	700	7			
	0.007	HG-T2-50	10-38	285	<0.5	0.14	0.009	700	6.3	0.009	680	6.12
	0.007	HG-T2-50	38-65	300.5	<0.5	0.15	0.003	700	2.1	0.003	680	2.04
	0.007	HG-T2-100	0-2	185.9	110	20.45	0.17	373.3	63.461			
	0.007	HG-T2-100	25->	350	0.6	0.21	0.032	700	22.4			
	0.007	LSH-T3-50	1-3	140.3	4.2	0.59	0.049	373.3	18.2917			
	0.007	LSH-T3-50	15-28	314.5	1.2	0.38	0.048	700	33.6			
	0.007	LSH-T3-50	28-63	307	0.7	0.21	0.028	700	19.6			
	0.007	LSH-T3-75	40-63	287	1.1	0.32	0.083	700	58.1			
	0.007	LSH-T3-75	73-78	311.5	<0.5	0.16	0.082	700	57.4			
	0.007	LSH-T3-330	33-39	313.5	1.3	0.41	0.006	700	4.2			
	0.007	LSH-T3-330	39-72	320.5	12	3.85	0.018	700	12.6			
	0.007	LSH-T4-20	0-21	144	130	18.72	0.18	700	126			
	0.007	LSH-T4-20	36-44	314	2.6	0.82	0.027	700	18.9			
	0.007	HG South Pond		273.5	160	43.76	0.18	700	126			
												0

Table 3a: Changes in Ni of Top Water, Key Lake Jar Experiment (7°C) Continued											
[Ni] in sediment											
SRC-Ni mg/L, before Potato Waste											
1-Dec-98, 20mL top water collected			1-Dec-99, 20mL top water collected			22-Aug-00, 20mL top water collected			18-Sep-01, 20mL top water collected		
ug/mL	total water vol. mL	tot-Ni released to water, ug/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar
0.042	680	28.56	0.072	660	47.52	0.085	635	53.975	0.12	615	73.8
0.034	680	23.1	0.06	660	39.6	0.067	635	42.5	0.075	615	46.1
0.016	680	10.88	0.004	660	2.64	0.008	635	5.08	0.002	615	1.23
0.007	680	4.76	0.007	660	4.62	0.009	635	5.715	0.002	615	1.23
0.005	680	3.4	0.004	660	2.64	0.021	635	13.335	0.002	615	1.23
0.008	660	5.28	0.01	640	6.4	0.016	615	9.84	0.01	595	5.95
0.22	680	149.6	0.029	660	19.14	0.018	635	11.43	0.016	615	9.84
0.019	680	12.92	0.005	660	3.3	0.016	635	10.16	0.003	615	1.845
0.033	680	22.44	0.06	660	39.6	0.07	635	44.45	0.087	615	53.505
0.031	680	21.08	0.015	660	9.9	0.009	635	5.715	0.002	615	1.23
0.001	680	0.68	0.006	660	3.96	0.006	635	3.81	0.003	615	1.845
0.009	680	6.12	0.015	660	9.9	0.023	635	14.605	0.026	615	15.99
0.001	680	0.68	0.004	660	2.64	0.01	635	6.35	0.006	615	3.69
0.014	680	9.52	0.004	660	2.64	0.023	635	14.605	**0.001**	615	0.615
0.008	680	5.44	0.007	660	4.62	0.035	635	22.225	**0.001**	615	0.615
0.46	680	312.8	0.2	660	132	0.15	635	95.25	0.23	615	141.45
0.002	680	1.36	0.011	660	7.26	0.015	635	9.525	0.01	615	6.15
0.001	680	0.68	0.003	660	1.98	0.016	635	10.16	0.002	615	1.23
0.21	680	142.8	0.14	660	92.4	0.16	635	101.6	0.17	615	104.55
0.15	353	52.995	0.17	333	56.661	0.19	308	58.577	0.19	288	54.777
0.008	680	5.44	0.012	660	7.92	0.016	635	10.16	0.012	615	7.38
0.46	680	312.8	0.029	660	19.14	0.048	635	30.48	0.028	615	17.22
1.0	680	680	1.7	660	1122	1.8	635	1143	1.9	615	1168.5
0.76	353.3	268.508	0.82	333	273.306	0.89	308	274.387	0.95	288	273.885
0.039	680	26.52	0.045	660	29.7	0.031	635	19.685	0.01	615	6.15
0.015	680	10.2	0.022	660	14.52	0.033	635	20.955	0.027	615	16.605
0.002	680	1.36	0.003	660	1.98	0.006	635	3.81	0.007	615	4.305
0.11	660	72.6	0.15	640	96	0.16	615	98.4	0.16	595	95.2
0.001	660	0.66	0.005	640	3.2	0.01	615	6.15	0.003	595	1.785
0.3	353	105.99	0.26	333.3	86.658	0.17	308	52.411	0.21	288	60.543
0.85	680	578	0.8	660	528	0.93	635	590.55	1.3	615	799.5
1.4	353	494.62	1.5	333.3	499.95	1.5	308	462.45	1.4	288	403.62
0.74	353	261.442	0.76	333.3	253.308	0.85	308	262.055	0.86	288	247.938
1	353	353.3	0.96	333.3	319.968	0.99	308	305.217	0.91	288	262.353
0.12	680	81.6	0.14	660	92.4	0.15	635	95.25	0.14	615	86.1
0.61	680	414.8	0.43	660	283.8	0.47	635	298.45	0.67	615	412.05
2	680	1360	1.8	660	1188	2.0	635	1270	1.9	615	1168.5
1.2	353	423.96	1.2	333.3	399.96	1.4	308	431.62	1.3	288	374.79
0.47	680	319.6	0.34	660	224.4	0.26	635	165.1	0.27	615	166.05
2.1	680	1428	2.5	660	1650	3.0	635	1905	3.4	615	2091
2.3	680	1564	2.6	660	1716	2.9	635	1841.5	3.1	615	1906.5
1.3	276	358.8	1.4	256	358.4	1.6	231	369.6	1.5	211	316.5
0.42	680	285.6	0.49	660	323.4	0.55	635	349.25	0.56	615	344.4
0.005	680	3.4	0.012	660	7.92	0.013	635	8.255	0.009	615	5.535
0.52	680	353.6	0.64	660	422.4	0.71	635	450.85	0.78	615	479.7
0.083	680	56.44	0.12	660	79.2	0.15	635	95.25	0.14	615	86.1
0.26	353	91.858	0.2	333	66.66	0.19	308	58.577	0.2	288	57.66
0.14	680	95.2	0.19	660	125.4	0.22	635	139.7	0.22	615	135.3
0.71	660	468.6	0.87	640	556.8	0.94	615	578.1	1	595	595
0.14	660	92.4	0.18	640	115.2	0.2	615	123	0.2	595	119
1.5	660	990	1.5	640	960	1.6	615	984	1.6	595	952
0.4	353	141.32	0.51	333	169.983	0.58	308	178.814	0.6	288	172.98
1.1	680	748	0.64	660	422.4	0.29	635	184.15	0.17	615	104.55
0.18	680	122.4	0.26	660	171.6	0.36	635	228.6	0.57	615	350.55
0.033	680	22.44	0.01	660	6.6	0.006	635	3.81	**0.001**	615	0.615

Table 3a: Changes in Ni of Top Water, Key Lake Jar Experiment (7°C) Continued

[Ni] in sediment

SRC-Ni mg/L, before Potato Waste

1-Dec-98, 20mL top water collected			1-Dec-99, 20mL top water collected			22-Aug-00, 20mL top water collected			18-Sep-01, 20mL top water collected		
ug/mL	total water vol. mL	tot-Ni released to water, ug/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar	ug/mL	total water vol. mL	tot-Ni released to water, ug/jar
0.014	680	9.52	0.041	660	27.06	0.04	635	25.4	0.032	615	19.68
0.001	680	0.68	0.004	660	2.64	0.005	635	3.175	0.004	615	2.46
0.001	680	0.68	0.019	660	12.54	0.001	635	0.635	0.002	615	1.23
nr	680	nr	0.005	660	nr	0.016	635	nr	0.007	615	nr
0.017	680	11.56	0.01	660	6.6	0.004	635	2.54	0.002	615	1.23
0.008	680	5.44	0.015	660	9.9	0.024	635	15.24	0.02	615	12.3
0.001	680	0.68	0.002	660	1.32	0.003	635	1.905	0.002	615	1.23
0.001	680	0.68	0.001	660	0.66	0.012	635	7.62	0.001	615	0.615
0.009	680	6.12	0.024	660	15.84	0.026	635	16.51	0.022	615	13.53
0.001	680	0.68	0.006	660	3.96	0.019	635	12.065	0.003	615	1.845
0.001	680	0.68	0.002	660	1.32	0.008	635	5.08	0.001	615	0.615
0.11	680	74.8	0.038	660	25.08	0.024	635	15.24	0.006	615	3.69
0.001	680	0.68	0.006	660	3.96	0.006	635	3.81	0.005	615	3.075
0.001	680	0.68	0.004	660	2.64	0.017	635	10.795	0.003	615	1.845
0.001	680	0.68	0.003	660	1.98	0.006	635	3.81	0.001	615	0.615
0.008	680	5.44	0.009	660	5.94	0.031	635	19.685	0.005	615	3.075
0.001	680	0.68	0.002	660	1.32	0.005	635	3.175	0.001	615	0.615
0.001	680	0.68	0.005	660	3.3	0.009	635	5.715	0.004	615	2.46
0.01	680	6.8	0.015	660	9.9	0.02	635	12.7	0.015	615	9.225
0.009	680	6.12	0.01	660	6.6	0.022	635	13.97	0.14	615	86.1
0.009	680	6.12	0.012	660	7.92	0.03	635	19.05	0.014	615	8.61
0.15	680	102	0.057	660	37.62	0.025	635	15.875	0.011	615	6.765
0.012	680	8.16	0.009	660	5.94	0.008	635	5.08	0.006	615	3.69
0.008	680	5.44	0.012	660	7.92	0.016	635	10.16	0.012	615	7.38
0.009	660	5.94	0.011	640	7.04	0.015	615	9.225	0.012	595	7.14
0.001	660	0.66	0.005	640	3.2	0.006	615	3.69	0.005	595	2.975
0.5	353	176.65	0.02	333.3	6.666	0.041	308	12.6403	0.041	288	11.8203
0.047	680	31.96	0.049	660	32.34	0.065	635	41.275	0.057	615	35.055
0.067	353	23.6711	0.07	333.3	23.331	0.077	308	23.7391	0.062	288	17.8746
0.04	680	27.2	0.027	660	17.82	0.025	635	15.875	0.023	615	14.145
0.02	680	13.6	0.012	660	7.92	0.016	635	10.16	0.009	615	5.535
0.06	680	40.8	0.059	660	38.94	0.054	635	34.29	0.057	615	35.055
0.062	680	42.16	0.06	660	39.6	0.061	635	38.735	0.056	615	34.44
0.002	680	1.36	0.005	660	3.3	0.016	635	10.16	0.003	615	1.845
0.045	680	30.6	0.044	660	29.04	0.052	635	33.02	0.034	615	20.91
0.23	680	156.4	0.062	660	40.92	0.049	635	31.115	0.048	615	29.52
0.057	680	38.76	0.071	660	46.86	0.073	635	46.355	0.071	615	43.665
0.026	680	17.68	0.056	660	36.96	0.017	635	10.795	0.012	615	7.38

.001=<0.001

Table 3a: Changes in Ni of Top Water, Key Lake Jar Experiment (7°C) Continued

[Ni] in sediment

18-Sep-01		22-Oct-01	15-Apr-02	10-Jun-02	18-Aug-02, 50mL top water collected ug/mL	total water vol. mL	tot-Ni in water, ug/jar	tot-Ni in water control jars, ug/jar	Reduction of Ni from EDO	Ni changes (Ni_{2002}-Ni_{1998}), ug/jar
2g of Potato Waste was added to 54 jars (in yellow hight light), respectively after 20mL top water was collected for chemist	14.6 ug Ni was added to jars which received potato waste, respectively	20mL top water collected	20mL top water collected	5g of Potato Waste was added to another 39 jars (in green hight light), respectively.						
					0.1	535	53.5			35.3
					0.076	535	40.7			30.2
					0.004	535	2.1			-9.76
					0.005	535	2.7			-1.53
					0.054	535	28.9			24.0
						515				nr
					0.018	535	9.6			-144.4
					0.011	535	5.9			-155.1
						535				
					0.008	535	4.3	3.745	0.54	-7.46
					0.017	535	9.1	3.745	5.35	-0.46
					0.044	535	23.5	3.745	19.80	-1.86
					0.012	535	6.4	3.745	2.68	0.95
					0.027	535	14.4	3.745	10.70	-7.46
					0.006	535	3.2	3.745	-0.54	-0.46
					0.008	535	4.3	3.745	0.54	-248.26
					0.014	535	7.5	3.745	3.75	-0.46
					0.006	535	3.2	3.745	-0.54	1.65
					0.019	535	10.2	3.745	6.42	-62.76
					0.006	208.3	1.2	1.458	-0.21	-17.95
					0.008	535	4.3	3.745	0.54	-3.26
					0.022	535	11.8	3.745	8.03	-115.26
					0.027	535	14.4	3.745	10.70	-437.26
					0.77	208.3	160.4	1.458	158.93	-136.66
					0.008	535	4.3	3.745	0.54	-3.26
					0.003	535	1.6	3.745	-2.14	-0.46
					0.12	535	64.2	3.745	60.46	-14.46
					0.003	515	1.5	3.605	-2.06	-29.30
					0.013	515	6.7	3.605	3.09	2.21
					0.12	208.3	25.0	1.458	23.54	-483.83
					0.44	535	235.4	3.745	231.66	-297.26
					0.016	208.3	3.3	1.458	1.87	-166.53
					0.024	208.3	5.0	1.458	3.54	-73.20
					0.026	208.3	5.4	1.458	3.96	-129.20
					0.011	535	5.9	3.745	2.14	-49.46
					0.046	535	24.6	3.745	20.87	-283.26
					0.28	535	149.8	3.745	146.06	-836.26
					0.21	208.3	43.7	1.458	42.28	-121.73
					0.27	535	144.5	3.745	140.71	-48.76
					0.15	535	80.3	3.745	76.51	-689.26
					0.37	535	198.0	3.745	194.21	-976.26
					0.37	131	48.5	0.917	47.55	-158.92
					0.027	535	14.4	3.745	10.70	-129.26
					0.011	535	5.9	3.745	2.14	-0.46
					0.19	535	101.7	3.745	97.91	-157.26
					0.066	535	35.3	3.745	31.57	-32.66
					2.1	208.3	437.4	1.458	435.97	-24.67
					0.33	535	176.6	3.745	172.81	-56.46
					0.08	515	41.2	3.605	37.60	-255.40
					0.037	515	19.1	3.605	15.45	-34.90
					0.014	515	7.2	3.605	3.61	-500.40
					0.009	208.3	1.9	1.458	0.42	-47.07
					0.007	535	3.7	3.745	0.00	-3.26
					0.066	535	35.3	3.745	31.57	-18.66
					14	535	7490.0	3.745	7486.26	-6.06

Table 3a: Changes in Ni of Top Water, Key Lake Jar Experiment (7°C) Continued

[Ni] in sediment

					18-Aug-02, 50mL top water collected					
18-Sep-01		22-Oct-01	15-Apr-02	10-Jun-02	ug/mL	total water vol. mL	tot-Ni in water, ug/jar	tot-Ni in water control jars, ug/jar	Reduction of Ni from EDO	Ni changes (Ni_{2002}-Ni_{1998}), ug/jar
2g of Potato Waste was added to 54 jars (in yellow hight light), respectively after 20mL top water was collected for chemistry analysis.	14.6 ug Ni was added to jars which received potato waste, respectively	20mL top water collected	20mL top water collected	5g of Potato Waste was added to another 39 jars (in green hight light), respectively.	0.079	-60	-4.7	-0.420	-4.32	-6.02
					0.1	535	53.5	3.745	49.76	2.35
					0.056	535	30.0	3.745	26.22	2.35
					0.92	535	492.2	3.745	488.46	nr
					0.12	535	64.2	3.745	60.46	-10.26
					0.1	535	53.5	3.745	49.76	0.24
					0.026	515	13.4	3.605	9.79	0.81
					0.032	535	17.1	3.745	13.38	0.95
					0.66	535	353.1	3.745	349.36	0.95
					0.93	-60	-55.8	-0.420	-55.38	-1.82
					0.3	535	160.5	3.745	156.76	-4.66
					1.1	535	588.5	3.745	584.76	-55.06
					0.043	535	23.0	3.745	19.26	0.95
					0.05	535	26.8	3.745	23.01	2.35
					0.033	535	17.7	3.745	13.91	1.65
					0.1	535	53.5	3.745	49.76	-2.56
					0.05	535	26.8	3.745	23.01	3.05
					0.05	535	26.8	3.745	23.01	3.05
					0.012	535	6.4	3.745	2.68	-0.46
					0.021	535	11.2	3.745	7.49	0.25
					0.022	535	11.8	3.745	8.03	-1.86
					0.063	208.3	13.1	1.458	11.66	-18.14
					0.15	535	80.3	3.745	76.51	-8.16
					0.069	535	36.9	3.745	33.17	-3.26
					0.05	535	26.8	3.745	23.01	-2.56
					0.038	208.3	7.9	1.458	6.46	-0.64
					0.37	535	198.0	3.745	194.21	-59.72
					0.15	535	80.3	3.745	76.51	-18.66
					0.94	535	502.9	3.745	499.16	-14.55
					0.21	515	108.2	3.605	104.55	-30.00
					0.14	515	72.1	3.605	68.50	-16.00
					0.36	208.3	75.0	1.458	73.53	-56.64
					0.28	535	149.8	3.745	146.06	-53.66
					0.14	208.3	29.2	1.458	27.70	-2.74
					0.14	208.3	29.2	1.458	27.70	-11.14
					1.83	208.3	381.2	1.458	379.73	-124.54
					0.05	535	26.8	3.745	23.01	-15.16
					0.019	535	10.2	3.745	6.42	-122.26

Appendix 1-4: Ni Balance Columns

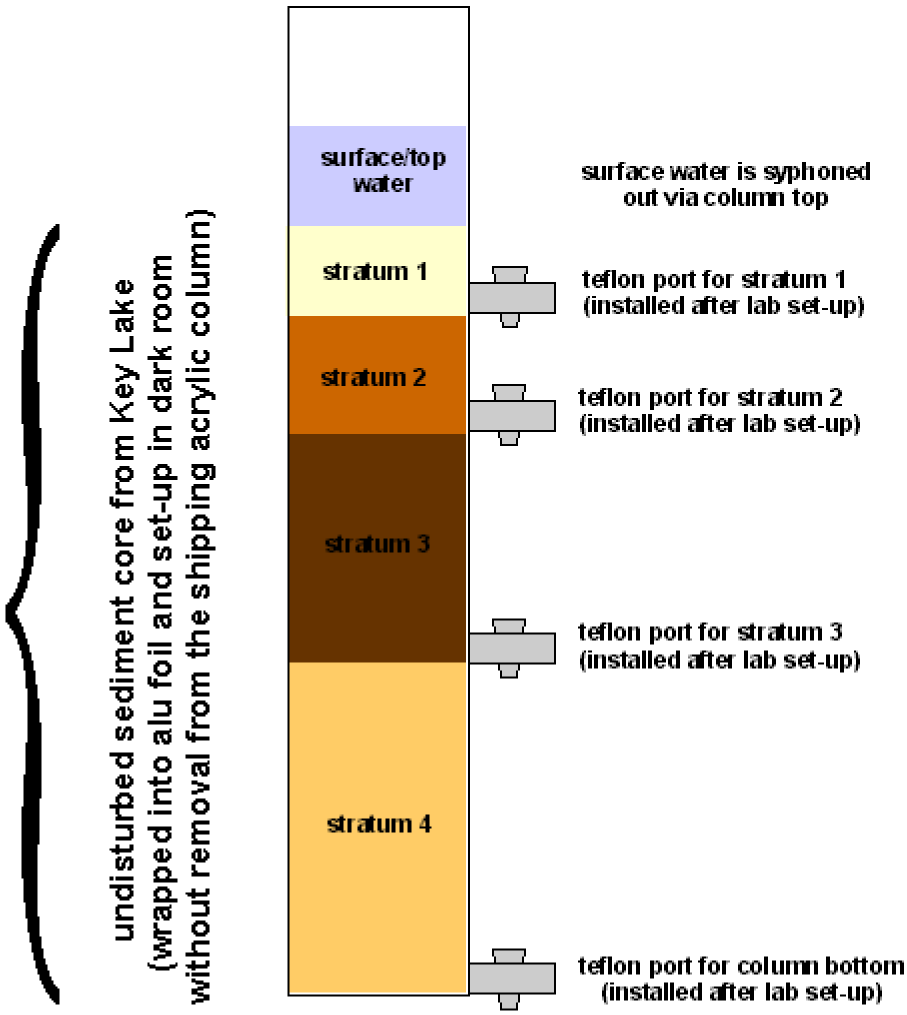
The total amount of Ni eluted by repeated flushing and drainage of each column is obtained by summing over the eluted water volumes, vol_{liq} times the analytical Ni concentration, [Ni] for all volumes:

$$[Ni]_{eluted} = \Sigma vol_{liq,\,i} * [Ni]_i \qquad (1)$$

The total Nickel content, Ni_{total}, in the columns is obtained from the volume of a sediment stratum, vol, its dry density ρ, and the Nickel concentration per kilogram sediment dry weight, [Ni] summed over all strata i:

$$Ni_{total} = \Sigma(vol_i * \rho_i * [Ni]_i) \qquad (2)$$

The volume is obtained from the radius of the acryl tubes, 7.62 cm and the height of the sediment stratum. The area of the column is 182.4 cm^2. It is assumed that the dry density is calculated to give a correct transformation of wet sediment volumes into dry sediment weight.



Schematic set-up of column experiments showing the position of the ports, surface water and four different sediment strata.

App 1-6: Ni balance in waters eluted from the column holding a sediment core of transect HG-T1-150

sampling date	**volume**	**[Ni] (SRC)**	**Ni total amount**	**port**	**transect**
	[dm^3]	[$mg\ dm^{-3}$]	[mg]		
					HG-T1-150
08Apr1999	0.1	0.005	0.0005		
24Nov1999	0.315	0.005	0.001575		
26Nov1999	0.25	0.21	0.0525		
20Jan2000	0.25	0.1	0.025		
11May2000	0.39	0.03	0.0117		
22Jun2000	0.31	0.015	0.00465		
09Aug2000	0.26	0.009	0.00234		
29Nov2000	0.222	0.008	0.00178		
05Oct2001	0.235	0.001	0.00024		
07Mar2002	0.28	0.004	0.00112	surface	
	0.155	0.038	0.00589	1-12.5 cm	
	0.415	0.024	0.00996	12.5-41 cm	
	0.44	0.008	0.00352	41-68.5 cm	
10Sep2002	0.23	0.118	0.023		
15Sep2003	0.24	0.017	0.00408	surface	
	0.05	0.035	0.00175	1-12.5 cm	
	0.35	0.032	0.0112	12.5-41 cm	
	0.775	0.006	0.00465	41-68.5 cm	
Sum			**0.17 mg**		

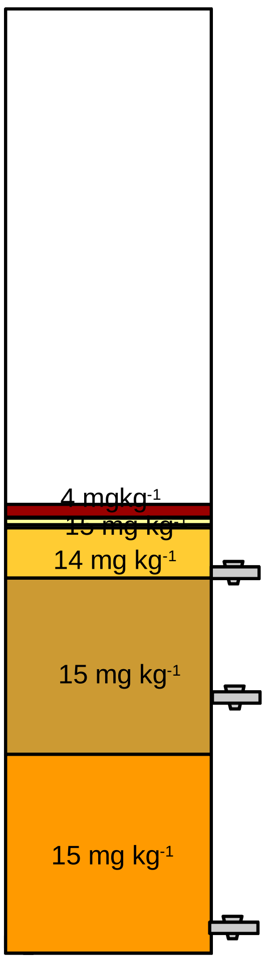
[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

App 1-6b: Ni balance in sediment of the column holding a sediment core of transect HG-T1-150

HG-T1-150	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
308 mg						
	2.5	456.20438	1.35	0.61588	4	2.4635
	1.5	273.72263	1.47	0.40237	15	6.03558
	8.5	1551.09489	1.58	2.45073	14	34.31022
	28.5	5200.72993	1.64	8.5292	15	127.93796
	32	5839.41606	1.57	9.16788	15	137.51825

HG-T1-150



App 1 Figure: Representation of the column set-up for the column holding a sediment core obtained at transect HG-T1-150. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum.

App 1-7: Ni balance in waters eluted from the column holding a sediment core of transect HG-T1-290

Date	volume	[Ni] (SRC)	Ni total amount	comment	transect
	[dm^3]	[mg dm^{-3}]	[mg]		
					HG-T1-290
08April1999	0.1	0.69	0.069		
24Nov1999	0.275	0.057	0.157		
26Nov1999	0.25	1.3	0.325		
20Jan2000	0.25	0.71*	0.1775		
11May2000	0.28	0.71	0.1988		
22Juni2000	0.28	0.52	0.1456		
09Aug2000	0.235	0.46	0.1081		
29Nov2000	0.215	0.33	0.07095		
05Oct2001	0.185	0.11	0.02035		
07Mar20021[a)]	0.25	0.053	0.01325	surface	
	0.27	0.0.055	0.01485	0-12	
	0.55	0.004	0.0022	12-62.5	
10Sep2002	0.255	0.256	0.06528		
15Sep2003 [a)]	0.2	0.045	0.009	surface	
	0.205	0.017	0.00349	0-12	
	0.59	0.002	0.00118	12-62.5	
			--		
Sum			**1.2**		

[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

App 1-7b: Ni balance in sediment of the column holding a sediment core of transect HG-T1-290

HG-T1-290	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
268 mg						
	8	1459.85401	0.5	0.72993	53	38.68613
	4	729.92701	1.18	0.86131	7	6.0292
	15	2737.22628	1.71	4.68066	15	70.20985
	39.5	7208.0292	1.52	10.9562	14	153.38686

HG-T1-290

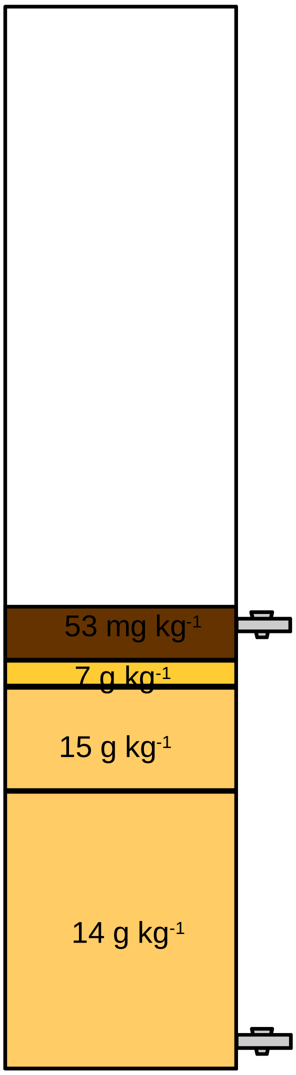


Figure: Representation of the column set-up for the column holding a sediment core obtained at transect HG-T1-290. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum.

App 1-8a: Ni balance in eluted waters from column holding the sediment core of transect HG-T2-0

sampling date	volume	[Ni] (SRC)	Ni total amount	comment	transect
	[dm^3]	[$mg\ dm^{-3}$]	[mg]		
					HG-T2-0
08April1999	0.1	0.02	0.002		
24Nov1999	1.06[b)]	0.077	0.08162		
26Nov1999	0.25	0.140	0.035		
20Jan2000	0.25	0.056	0.014		
11May2000	0.4	0.012	0.0048		
22Juni2000	0.505	0.006	0.00303		
09Aug2000	0.425	0.011	0.00467		
29Nov2000	0.38	0.008	0.00304		
05Oct2001	0.275	0.006	0.00165		
07Mar2002[a)]	0.41	0.004	0.00164	surface	
	0.21	0.003	0.00063	0-13.5	
	0.14	0.042	0.00588	13.5-36	
	0.12	0.011	0.00132	36-57.5	
	0.18	0.062	0.01116	57.5-72.5	
	0.038	0.089	0.00338	72.5-78.5	
10Sep2002	0.35	0.272	0.0952		
15Sep2003 [a)]	0.54	0.027	0.01458	surface	
	0.144	0.320	0.04608	0-13.5	
	0.144	0.024	0.00346	13.5-36	
	0.168	0.016	0.00269	36-57.5	
	0.142	0.047	0.00667	57.5-72.5	
	0.135	0.064	0.00864	72.5-78.5	
Sum			**0.35**		

[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

[b)] the column was running dry due to leaking ports. The defect was amended. For calculating the Ni release, the total volume of the column was multiplied by the maximum observed Ni concentration. The resulting value makes up for about half of calculated total Ni release.

App 1-8b: Ni balance in sediment of the column holding a sediment core of transect HG-T2-0

HG-T2-0	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
43 mg						
	8	1459.85401	0.98	1.43066	3.5	5.0073
	3.5	638.68613	1.24	0.79197	1.3	1.02956
	38.5	7025.54745	1.21	8.50091	2.8	23.80255
	22.5	4105.83942	1.36	5.58394	2	11.16788
	10.5	1916.05839	1.26	2.41423	0.7	1.68996

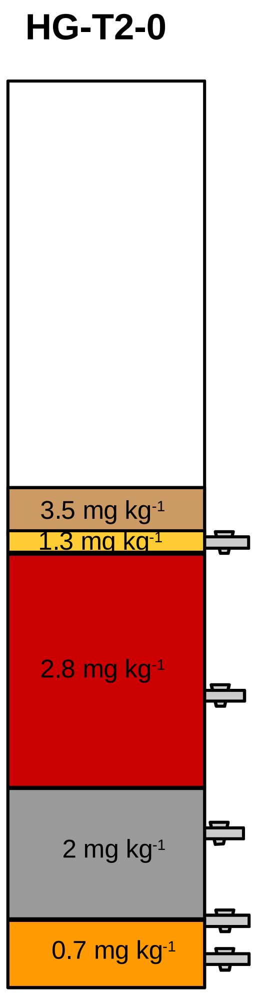


Figure: Representation of the column set-up for the column holding a sediment core obtained at transect HG-T2-0. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum.

App 1-9a: Ni balance in eluted waters from column holding the sediment core of transect HG-T2-50

sampling date	volume	[Ni] (SRC)	Ni total amount	comment	transect
	[dm^3]	[mg dm^{-3}]	[mg]		
					HG-T2-50
08April1999	0.1	0.058	0.0058		
24Nov1999	0.67	1.5	1.005		
26Nov1999	0.25	1.5*	0.975		
20Jan2000	0.25	1.5	0.7		
11May2000	0.5	1.3	0.65		
22Juni2000	0.475	0.94	0.4465		
09Aug2000	0.43	0.88	0.3784		
29Nov2000	0.415	0.97	0.40255		
05Oct2001	0.41	0.94	0.3854		
07Mar2002[a)]	0.51	0.68	0.3468	surface	
	0.21	0.30	0.063	0-11 cm	
	0.23	0.36	0.0828	11-23 cm	
	0.44	0.38	0.1672	23-48.5 cm	
	0.935	0.50	0.4675	48.5-91 cm	
10Sep2002	0.41	0.464	1.599		
15Sep2003 [a)]	0.425	0.29	0.12325	surface	
	0.098	0.23	0.02254	0-11 cm	
	0.063	0.19	0.01197	11-23 cm	
	0.38	0.29	0.1102	23-48.5 cm	
	0.97	0.49	0.4753	48.5-91 cm	
Sum			**5.1**		

[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

App 1-9b: Ni balance in sediment of the column holding a sediment core of transect HG-T2-50

HG-T2-50	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
407 mg						
	8	1459.85401	0.69	1.0073	49	49.35766
	1	182.48175	1.1	0.20073	25	5.01825
	2	364.9635	1.68	0.61314	14	8.58394
	10	1824.81752	1.57	2.86496	18	51.56934
	26.5	4835.76642	1.42	6.86679	16	109.86861
	47.5	8667.88321	1.62	14.04197	13	182.54562

HG-T2-50

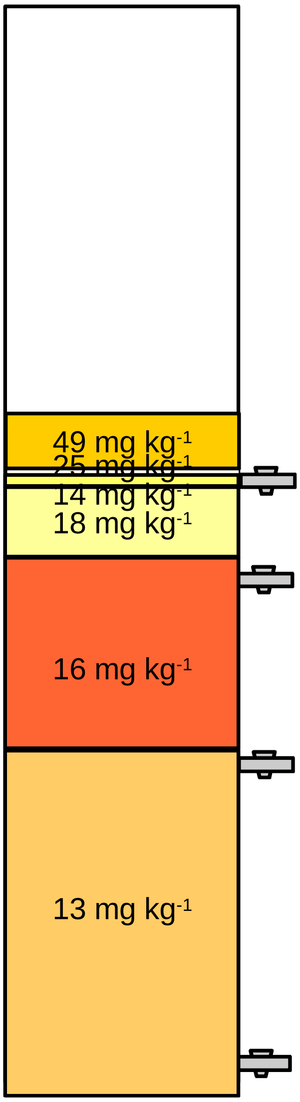


Figure: Representation of the column set-up for the column holding a sediment core obtained at transect HG-T2-50. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum.

App 1-10a: Ni balance in eluted waters from column holding the sediment core of transect HG-T2-75

sampling date	volume	[Ni] (SRC)	Ni total amout	comment	transect
	[dm^3]	[mg dm^{-3}]	[mg]		
					HG-T2-75
08April1999	0.1	0.23	0.023		
24Nov1999	1.06[b)]	1.4	1.484		
26Nov1999	0.25	22	5.5		
20Jan2000	0.25	1.4*	0.35		
11May2000	0.35	0.46	0.161		
22Juni2000	0.305	1.4	0.427		
09Aug2000	0.23	0.86	0.1978		
29Nov2000	0.215	0.46	0.0989		
05Oct2001	0.136	0.38	0.05168		
07Mar2002[a)]	0.185	0.25	0.04625	surface	
	0.25	0.36	0.09	0-12 cm	
	0.13	1.70	0.221	12-26 cm	
	0.184	0.43	0.07912	26-57 cm	
	port blocked	no sample	--	57-75 cm	
10Sep2002	0.265	0.671	0.17782		
15Sep2003 [a)]	0.37	0.44	0.1628	surface	
	0.175	0.18	0.0315	0-12 cm	
	0.06	0.86	0.0516	12-26 cm	
	0.124	0.34	0.04216	26-57 cm	
	0.33	0.22	0.0726	57-75 cm	
Sum			**9.3**		

[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

[b)] the column was running dry due to leaking ports. The defect was amended. For calculating the Ni release, the total volume of the column was multiplied by the maximum observed Ni concentration. The resulting value makes up for about half of calculated total Ni release

App 1-10b: Ni balance in sediment of the column holding a sediment core of transect HG-T2-75

HG-T2-75	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
950 mg						
	7.5	1368.61314	0.91	1.24544	81	100.88047
	3	547.44526	0.84	0.45985	120	55.18248
	1.5	273.72263	1.16	0.31752	120	38.10219
	14	2554.74453	1.04	2.65693	110	292.26277
	31	5656.93431	0.6	3.39416	130	441.24088
	22	4014.59854	1.24	4.9781	4	19.91241

HG-T2-75

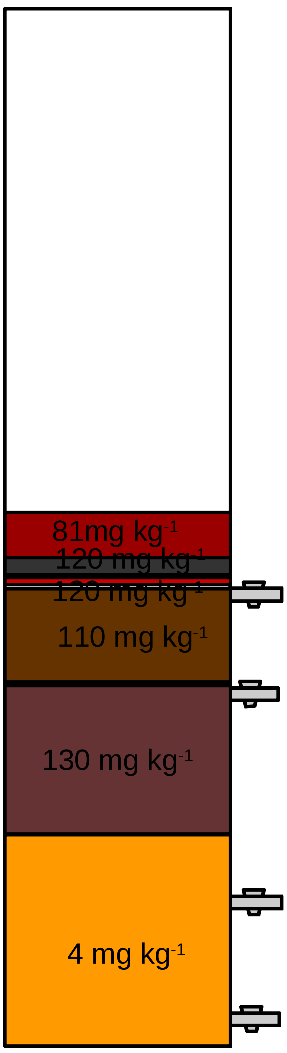


Figure: Representation of the column set-up for the column holding a sediment core obtained at transect HG-T2-75. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum

App 1-11a: Ni balance in eluted waters from column holding the sediment core of transect LHS-T3-50

sampling date	volume	[Ni] (SRC)	Ni total amout	comment	transect
	[dm^3]	[mg dm^{-3}]	[mg]		
					LHS-T3-50
08April1999	0.1	1.2	0.12		
24Nov1999	0.6	0.094	0.0564		
26Nov1999	0.25	0.14	0.035		
20Jan2000	0.25	0.056	0.014		
11May2000	0.44	1.7	0.748		
22Juni2000	0.485	0.71	0.34435		
09Aug2000	0.415	0.64	0.2656		
29Nov2000	0.415	0.89	0.36935		
05Oct2001	0.417	1	0.417		
07Mar2002[a)]	0.48	0.59	0.2832	surface	
	0.09	0.17	0.0153	0-17.5 cm	
	0.103	0.026	0.002678	17.5-95.5 cm	
10Sep2002	0.44	0.617	0.27148		
15Sep2003[a)]	0.4	0.14	0.056	surface	
	0.029	0.07	0.00203	0-17.5 cm	
	0.99	0.02	0.0198	17.5-95.5 cm	
Sum			**3.0**		

[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

App 1-11b: Ni balance in sediment of the column holding a sediment core of transect LHS-T3-50

LHS-T3-50	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
84 mg						
	7	1277.37226	0.7	0.89416	38	33.9781
	10.5	1916.05839	1.24	2.37591	9.6	22.80876
	82.5	15054.74453	1.51	22.73266	1.2	27.2792

LHS-T3-50

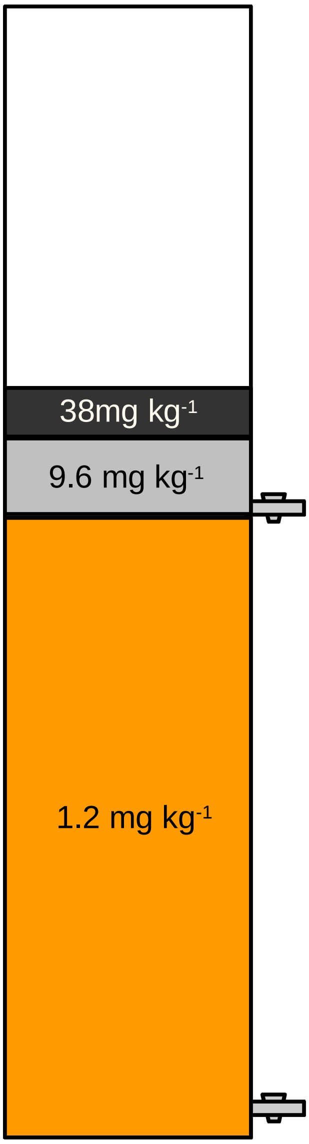


Figure: Representation of the column set-up for the column holding a sediment core obtained at transect LHS-T3-50. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum

App 1-12a: Ni balance in eluted waters from column holding the sediment core of transect LHS-T3-75

sampling date	volume	[Ni] (SRC)	Ni total amout	comment	transect
	[dm^3]	[mg dm^{-3}]	[mg]		
					LHS-T3-75
08April1999	0.1	4.4	0.44		
24Nov1999	0.24	1.00	0.24		
26Nov1999	0.25	4.4*	1.1		
20Jan2000	0.25	1.5	0.375		
11May2000	0.48	1.7	0.816		
22Juni2000	0.465	1.5	0.6975		
09Aug2000	0.425	1.2	0.51		
29Nov2000	0.295	0.64	0.1888		
05Oct2001	0.28	0.84	0.2352		
07Mar2002[a)]	0.33	0.35	0.1155	surface	
	0.34	0.13	0.0442	0-24 cm	
	0.075	0.31	0.02325	24-35 cm	
	0.23	0.50	0.115	35-49 cm	
	--[b)]	--[b)]	--[b)]	49-57.5 cm	
	--[b)]	--[b)]	--[b)]	57.5-87 cm	
10Sep2002	0.44	4.4*	1.936		
15Sep2003[a)]	0.425	0.35	0.14875	surface	
	0.165	0.053	0.00874	0-24 cm	
	0.034	0.12	0.00408	24-35 cm	
	0.028	0.35	0.0098	35-49 cm	
	0.026	0.333	0.00866	49-57.5 cm	
	0.13	0.45	0.0585	57.5-87 cm	
Sum			**6.9**		

[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

[b)] port blocked. No sample collected

App 1-12b: Ni balance in sediment of the column holding a sediment core of transect LHS-T3-75

LHS-T3-75	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
573 mg						
	24	4379.56204	0.54	2.36496	190	449.34307
	11	2007.29927	1.32	2.64964	18	47.69343
	14	2554.74453	1.74	4.44526	1.6	7.11241
	8.5	1551.09489	1.44	2.23358	5.2	11.6146
	33.5	6113.13869	1.76	10.75912	2	21.51825

LHS-T3-75

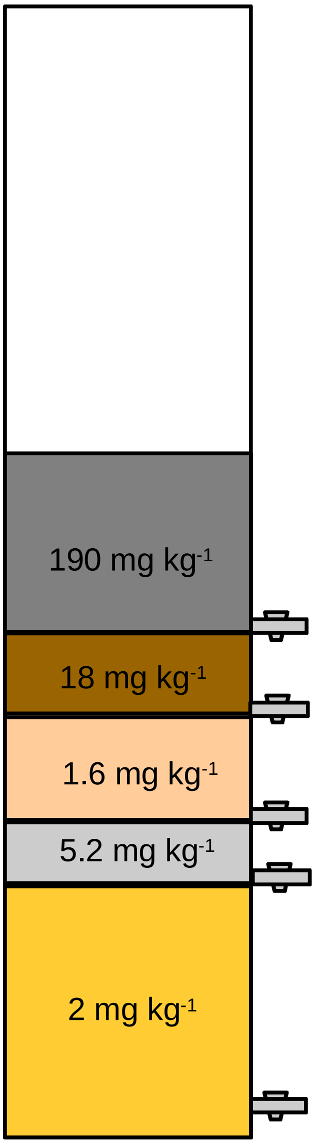


Figure: Representation of the column set-up for the column holding a sediment core obtained at transect LHS-T3-75. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum

App 1-13a: Ni balance in eluted waters from column holding the sediment core of transect HG-307C

sampling date	volume	[Ni] (SRC)	Ni total amount	comment	transect
	[dm^3]	[mg dm^{-3}]	[mg]		
					HG-307C
08April1999	0.1	0.38	0.038		
24Nov1999	0.918	0.032	0.02938		
26Nov1999	0.25	0.13	0.0325		
20Jan2000	0.25	0.38	0.095		
11May2000	0.54	0.24	0.1296		
22Juni2000	0.52	0.17	0.0884		
09Aug2000	0.465	0.11	0.05115		
29Nov2000	0.5	0.052	0.026		
05Oct2001	0.555	0.037	0.02054		
07Mar2002[a)]	0.542	0.01	0.00542	surface	
	0.145	0.002	0.00029	0-10.5 cm	
	0.128	0.002	0.00026	10.5-19.5 cm	
	1.09	0.007	0.00763	19.5-92 cm	
10Sep2002	0.23	0.29	0.0667		
15Sep2003 [a)]	0.36	0.012	0.00432	surface	
	0.123	0.004	0.00049	0-10.5 cm	
	0.06	0.01[b)]	0.0006	10.5-19.5 cm	
	1.46	0.006	0.00876	19.5-92 cm	
Sum			**0.60**		

[*)] due to lack of analytical data, the highest observed Ni concentration is used

[a)] on these dates, samples were collected at ports installed in the columns at heights determined by sediment strata analysis. The 'comment' column gives the range of these strata.

[b)] Concentration below detection limit. Detection limit value is used.

App 1-13b: Ni balance in sediment of the column holding a sediment core of transect HG-307C

HG-307C	height [cm]	sediment volume [mL]	dry density [kg dm^{-3}]	sediment dry weight [kg dm^{-3}]	[Ni] mg kg^{-1}	total Ni [mg]
329 mg						
	10.5	1916.05839	0.99	1.8969	48	91.05109
	9	1642.33577	1.37	2.25	0.7	1.575
	76.5	13959.85401	1.69	23.59215	10	235.92153

HG-307C

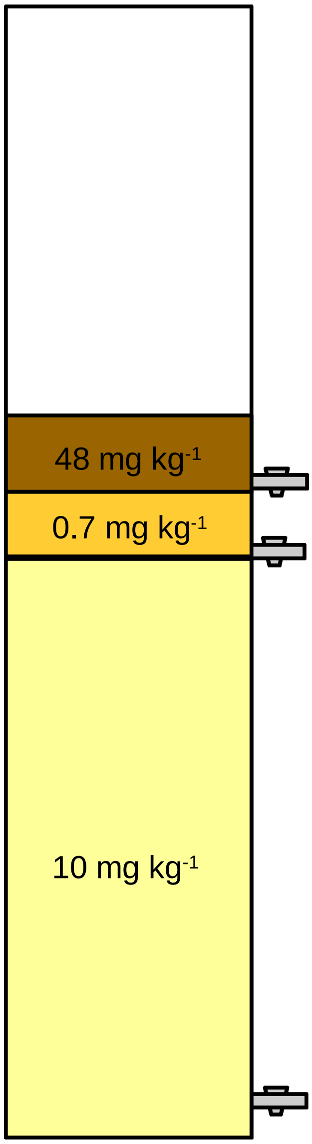


Figure: Representation of the column set-up for the column holding a sediment core obtained at transect HG-307C. The sediment strata heights and cocks are drawn to scale. The colour of strata attempts to match with the real sediments. The ports location indicates the strata from which the water was syphoned. The Nickel concentrations in mg kg^{-1} are given with each stratum

Sources of information for Ni balance in water:

data file: Column expt results updated 22-Oct-05.xls

information for port samplings:

- table 5b PW observation: column 'collected volumes'
- table 11b port Ni: column '1065 days: [Ni]' and '1640 days [Ni] (SRC data only)

information for bottom samplings:

- table 4: water add collect
- table 12 TW elements: section 'Ni,mg/l'

App1-Table 2: [Ni] (mg/L) in SSW

Transect	Depth cm	1065 days		1640 days		Transect	Depth cm	1065 days		1640 days	
		[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)	[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)			[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)	[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)
HG-T2-75	top	0.348	0.25	0.677	0.440	HG-T2-50	top	0.292	0.68	0.382	0.290
	0-12	0.833	0.36	1.95	0.18		0-11	0.372	0.300	0.359	0.230
	12-26	1.48	1.7	no sample	0.86		11-23	0-Jan	0.360	0.436	0.190
	26-57	1.86	0.43	4.43	0.34		23-48.5	0.197	0.380	0.544	0.290
	57-75	NA	NA	2.56	0.22		48.5-91	0.215	0.500	0.697	0.490
LSH-T3-50	top	0.269	0.59	0.232	0.140	HG-T1-150	top	0.0266	0.004	0.057	0.017
	0-5.5	0.383	0.17	no sample	0.07		0-12.5	0.114	0.038	0.233	0.035
	5.5-8.3	0.118	0.026	0.05	0.02		12.5-41	0.0416	0.024	0.047	0.032
							41-68.5	0.0416	0.008	0.078	0.006
HG-T2-0	top	0.077	0.004	0.13	0.027	LSH-T3-75	top	0.283	0.350	0.576	0.35
	0-13.5	0.108	0.003	2.33	0.320		0-24	0.258	0.130	0.473	0.053
	13.5-36	4.44	0.042	0.32	0.024		24-35	0.133	0.310	0.175	0.12
	36-57.5	3.63	0.011	17.9	0.016		35-49	0.533	0.500	0.344	0.35
	57.5-72.5	3.58	0.062	16.4	0.047					no sample	0.333
	72.5-78.5	2.56	0.089	18.6	0.064					0.697	0.45
HG-T1-290	top	0.072	0.053	0.109	0.045	HG 307C	top	0.223	0.010	0.161	0.012
	0-13	0.108	0.055	0.798	0.017		0-10.5	0.0928	0.002	0.236	0.004
	13-63.5	0.683	0.004	0.544	0.002		10.5-19.5	0.0978	0.002	0.236	<0.01
							19.5-92	0.243	0.007	0.390	0.006

App1-Table 3: [Ni] (mg/L) in DPW in column

Location	8-Apr-99	24-Nov-99*	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	10-Sep-02	15-Sep-03
Ni, mg/L (analysed by SRC)												
HG - T1 - 150	0.005	NA	0.210	0.10	0.030	0.015	0.009	0.008	0.001	0.004	0.118	0.017
HG - T1 - 290	0.69	NA	1.30	NA	0.71	0.52	0.46	0.33	0.11	0.053	0.256	0.045
HG - T2 - 0	0.02	NA	0.140	0.056	0.012	0.006	0.011	0.008	0.006	0.004	0.272	0.027
HG - T2 - 50	0.058	0.021	NA	1.50	1.30	0.94	0.88	0.97	0.94	0.68	0.464	0.29
HG - T2 - 75	0.23	NA	22	NA	0.46	1.40	0.86	0.46	0.38	0.25	0.671	0.44
LSH - T3 - 50	1.20	0.094	3.90	2.80	1.70	0.71	0.64	0.89	1.00	0.59	0.617	0.14
LSH - T3 - 75	4.40	1.00	3.20	0.46	1.70	1.50	1.20	0.64	0.84	0.35	1.048	0.35
HG 307 C	0.38	0.032	0.130	0.29	0.24	0.17	0.11	0.052	0.037	0.01	0.64	0.012

NA: Due to not enough water samples.

* Water was drained for entire column through the bottom port.

App2-Table 1: Historic Activitives:Key Lake **Column-Room (20°C)** Experiment

Date	Activity		Analysis		Assayer#
	Top water	Pore water	Boojum Lab	SRC Lab	
20-Mar-99	Experiment Set Up (Eight Columns were set up in the basement without light)				
21-Mar-99 to 7-Apr-99	DH_2O was syphoned into each column from the surface.				
8-Apr-99		100 ml water sample was drained from the port at the bottom of each column	pH, Eh, Cond. Temp Acidity, Alka.	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	7740 -7747; 7748-7755;
24-Nov-99	DH_2O was syphoned into each column from the surface.	water sample was drained at the bottom of each column completely. two columns were dry out.	pH, Eh, Cond. Temp Acidity, Alka.	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	8296-8301; 9778,9779, 9728-9731
26-Nov-99	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	8302-8309; 9780, 9732-9738
20-Jan-00	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	8436-8443 9739-9744
11-May-00	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	9570-9577
22-Jun-00	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	9578-9585
9-Aug-00	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	9586-9593
29-Nov-00	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	9594-9601
5-Oct-01	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	9602-9609
7-Mar-02	DH_2O was syphoned into each column from the surface.	water sample was drained from the ports at each depth.	pH, Eh, Cond. Temp Acidity	ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	9745-9777
10-Sep-02	Water was syphone out and then DH_2O was syphoned into each column from the surface.		pH, Eh, Cond. Temp Acidity		
15-Sep-03 to 16-Sep-03		water sample was drained from the ports at each depth.	pH, Eh, Cond. Temp Acidity		
18-Sep-03	The columns were dimissed and the experiment was completed.				
	Qualitative description of sediment, wet density, moisture content, slurry chemistry (pH, Eh, Cond. Temp Acidity,Ni)				
16-Mar-05	Analysis of the water samples collected on Sep 15-16, 2003			ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	10541-10576; 10577-10612
	Analysis of sediment samples collected on 18-Sep-03.			ICP-25 + S, NH_3, NO_2+NO_3, PO_4, TKN	10613-10649

Monitoring of Columns

Set up 21-Mar-99 to 7-Apr-99	1-2 8-Apr-99 & 24-Nov-99	3-9 26-Nov-99 to 5-Oct-00	10th 7-Mar-02	11th 10-Sep-02	12th 15-Sep-03 to 16-Sep-03
	Pore Water at bottom	Top Water	Water Profile	Top Water	Water Profile

App2-Table 2: Set up of Sediment Column Leaching Experiment from 21-Mar-99 to 7-Apr-99.

Transect	Sediment description	Column sediment height (cm)	Column sediment volume (cm^3)	Port installed (cm)	Volume of DH_2O added to column during set up mL				Hydraulic Cond. (mL/sec.)
					1st 21-Mar-99	2nd 27-Mar-99	3rd 7-Apr-99	total	
HG-T2-75	brown organics	79	948	12	500	0	260	760	slow
				26					
				57					
				75					
LSH-T3-50	sand	100	1200	17.5	500	400	2100	3000	initial = 2.8, final = 1.2
				95.5					
HG-T2-0	red oxidized sand	83	996	13.5	500	400	150	1050	not measured
				36					
				57.5					
				72.5					
				78.5					
HG-T1-290	sand	66.5	798	12	100	0	240	440	slow
				62.5					
HG-T2-50	sand	96	1152	11	500	400	1200	2100	initial = 1.1
				23					
				48.5					
				91					
HG-T1-150	oxidized sand	73	876	12.5	500	400	650	1550	initial = 1.2
				41					
				68.5					
LSH-T3-75	sand	91	1092	24	500	0	750	1250	initial = 0.18
				35					
				49					
				57.5					
				87					
HG 307C	red oxidized sand	96	1152	10.5	500	400	2080	2980	initial = 2.3
				19.5					
				92					

App2-Table 3: Description of Column Strata

Transect	Height of sediment column (m)	Observation March 1999			Observation September 2003		
		Stratum (cm)	Description	Moisture	Stratum (cm)	Description	Moisture
HG-T1-150	0.73	0-3	light brown sand and some moss	dry	0-2.5	Fe oxidized rust color, coarse sand, lots of gravels	moist
		3-5	orange sand		2.5-4	light yellow, brown & beige mixed, coarse sand a few gravels	
		5-9	purple and orange sand		4 -12.5	beige coarse sand, a few gravels	
		9-43	beige sand		12.5-41	beige and light yellow mixed coarse sand, a few black lumps, some gravels	
		43-73	orange / beige sand		41-73	Fe oxidized orange mixed with some beige coarse sand, lots of gravels	
HG-T1-290	0.665	0-5	dark brown soil	partially saturated upon collection	0-8	0-0.5cm Fe oxidized orange slates, 0.5-8cm dark brown slates, fine, loam like	moist
		5-11	orange / beige silt		8-12	Fe oxidized orange mixed with gray, fine silt	very wet
		11-26	light orange to beige sand		12-27	light yellow coarse sand , some gravels	moist
		26-66.5	beige sand		27-66.5	faint purple mixed with lots of tiny black spots, coarse sand, some gravels, 0.5cm Fe oxidized layer at bottom	
HG-T2-0	0.83	0-4	moss shoots and roots, dark gray sand	dry	0-8	moss on top, light brown medium sand	moist
		4-10	light gray sand with black thick striation		8-11.5	brown medium sand, a few straw, slightly Fe oxidized.	moist
		10-54	medium red oxidized sand		11.5-50	Fe rust color, Fe oxidized medium sand mixed with dark gray layer, some straw	moist
		54-71	medium gray with black striation		50-72.5	white and black layers mixed, some debris and gravels, 0.3 cm brown layer at bottom, strong burning smell.	very wet
		71-83	medium red oxidized sand		72.5-83	strong orange and Fe oxidized medium sand, 72.5-75.5cm Fe oxidized brown sand layer	moist-wet
HG-T2-50	0.96	0-8	medium brown soil	dry	0-8	orangish brown fine loam like mixed with black clay like slates	moist
		8-20	mixed beige and orange sand		8-9	white medium sand mixed with black clay like slates	
		20-43	orange sand		9-11	yellowish beige medium sand, a few gravels and a few small fine black lumps	
		43-96	beige sand		11-21	light yellow medium sand mixed with some gravels	
					21-48.5	Fe oxidized orange medium sand, partially mixed with light yellow coarse sand	
					48.5-96	most beige sand, some yellow close to the wall, coarse sand, lots of gravels	wet

Table 3: Description of Column Sediments (cont.)

Transect	Height of sediment column (m)	Observation (January 2000)			Observation (September 2003)		
		Stratum (cm)	Description	Moisture	Stratum (cm)	Description	Moisture
HG-T2-75	0.79	0-4.5	moss and organics	partially saturated upon collection	0-7.5	moss on top, Fe oxidized brown fine sand	moist
		4.5-10	brown beige sand		7.5-10.5	black mixed with white and Fe oxidized layers, clay like	
		10-23	medium brown, $Fe(OH)_3$ dark red, dark gray		10.5-12	Fe oxidized mixed with some black and white clay like chunks, medium sand,	
					12-26	dark brown mixed with some small black lumps, fine sand, burning smell	
		23-57	23-37.5cm red oxidized, 37.5-52.5 dark red oxidized, 52.5-57cm orange and gray		26-57	most dark brown thick layers mixed with reddish Fe oxidized thinner layers, fine, loam like, loose, burning smell	very wet
		57-79	57-62.5cm dark gray clay, 62.5-79cm medium gray		57-79	white mixed with Fe oxidized orange thick layers with 0.5-1cm black layers in between. 3cm Fe oxidized at bottom, silt	
LSH-T3-50	1.0	0-7.8	dark brown organics	dry	0-7	black loam like lumps mixed with Fe oxidized orange fine sand	moist
		7.8-12.5	gray silt		7-17.5	gray mixed with Fe oxidized and light yellow layers, fine silt	
		12.5-18.5	dark brown organics		17.5-100	beige medium sand, a very thinner layer around the interface between sed and wall is light yellow	
		18.5-67	pink sand				
		67-100	pink sand				
LSH-T3-75	0.91	0-23	moss on top, dark brown soil, roots	dry	0-24	moss on top, oxidized Fe on moss, 0-4/14cm thickness of moss, dark brown loam like, fine; 4/14-24 cm dark gray slates, fine, clay like, burning smell	wet
		23-33	23-26cm orange silt, 26-33cm gray silt with black		24-35	24-34cm dark brown, gray and some orange mixed clay, 34-35cm moss, dark, very fine	
		33-45	beige sand		35-49	beige medium sand with very thin Fe oxidized layer at 36-36.3cm	
		45-56	medium gray silt		49-57.5	49-51cm gray silt, 51-57.5cm whitish gray clay like, very fine	
		56-78	orange and beige sand		57.5-91	57.5-61cm gray mixed with Fe oxidized layers, silt, 61-63cm orange mixed with Fe oxidized layer, sand, 63-87cm beige coarse sand mixed with a few Fe oxidized layers	very wet
		78-91	beige sand				
HG 307C	0.96	0-8	moss and dark brown organic soil	dry	0-10.5	moss on top, 0-3cm dark brown, 3-10.5cm orange and dark brown mixture, medium sand	moist
		8-18	red oxid. Sand		10.5-19.5	10.5-15cm orange, 15-19.5 light orange, very few moss roots, coarse sand	
		18-96	orange to dark orange sand with gravels		19.5-96	19.5-38cm orange, 38-75cm light yellow, 75-92cm beige, coarse sand, very few moss roots, some gravels	wet

App2-Table 4 Water Volume Collected and Added on Top of Column Sediment during Experiment

Date	Top water mL	HG T2 - 75	LSH T3 - 50	HG T2 - 0	HG T1 - 290	HG T2 - 50	HG T1 - 150	LSH T3 - 75	HG 307 C
21-Mar-99	added	500	500	500	100	500	500	500	500
27-Mar-99		0	400	400	0	400	400	0	400
7-Apr-99		260	2100	150	340	1200	650	750	2080
8-Apr-99	collected	100	100	100	100	100	100	100	100
24-Nov-99	*collected	dry	600	dry	275	670	315	240	918
	added	1290	1780	1880	1180	2520	1490	2180	2000
26-Nov-99	added	250	250	250	250	250	250	250	250
	collected	250	250	250	250	250	250	250	250
20-Jan-00	collected	250	250	250	250	250	250	250	250
	added	363	385	321	300	352	339	334	425
11-May-00	collected	350	440	400	280	500	300	480	540
	added	315	430	400	255	490	390	480	450
22-Jun-00	collected	305	485	505	280	475	310	465	520
	added	315	475	490	270	470	295	445	500
9-Aug-00	collected	230	415	425	235	430	260	425	465
	added	275	480	455	250	475	270	440	490
29-Nov-00	collected	215	415	380	215	415	222	295	500
	added	300.5	470	300.5	245	460	185	345	570
5-Oct-01	collected	136	417	275	185	410	230	280	555
	added	230	481.75	444.5	250	483.5	312	330	473
7-Mar-02	collected	185	480	410	250	510	280	330	542
	added	760	730	1030	1025	2140	1255	1090	1825
10-Sep-02	collected	265	440	350	255	410	230	440	230
	added	360	510	480	250	230	290	460	595
15-Sep-03	collected	370	400	540	200	425	240	425	360

* Water was drained for entire column through the bottom port before water addition.

App2-Table 5a: Top Water Physical Characteristics Observation

Transect	HG - T2 - 75	LSH - T3 - 50	HG - T2 - 0	HG - T1 - 290	HG - T2 - 50	HG - T1 - 150	LSH - T3 - 75	HG 307 C
8-Apr-99	clear	clear	dark tea	clear	clear	clear	med. yellow tea	slightly turbid, med. dark tea
24-Nov-99	clear	clear	dark tea	clear	clear	clear with organics	med. yellow tea	slightly turbid, med. dark tea
26-Nov-99	clear	clear	dark tea	clear	clear	clear with floating organics	med. yellow tea	slightly turbid, med. dark tea
20-Jan-00	clear	clear	dark tea	clear	clear	clear	med. yellow tea with floating organics	some turbid, med. dark tea with some organics
11-May-00	faint green	clear	dark tea, turbid	clear	clear	med turbid	dark tea, slightly turbid	slightly turbid, med. dark tea
22-Jun-00	turbid, light brown with white powder on surface	clear	dark tea, turbid	clear	clear	clear	turbid, dark tea	turbid, brown foam on surface, dark tea
9-Aug-00	very turbid, brown with white powder on surface	clear	very turbid, dark tea	clear	clear	clear	turbid, dark tea	very turbid, brown foam on surface, dark tea
29-Nov-00	turbid, tea color, foam on surface	clear	very turbid, dark tea	clear	clear	clear	turbid, dark tea	turbid, tea color, jarosite layer on surface
5-Oct-01	strong tea color, turbid, foam on surface	clear	light tea	clear	clear	clear	tea color, some foam on surface	tea color, turbid, jarosite layer on surface
7-Mar-02	clear	clear	clear	clear	clear	clear	orange	faint yellow
15-Sep-03	clear	clear	clear	clear	clear	clear	light tea	clear

App2-Table 5b: Pore Water Physical Characteristics Observation

Transect	Water depth cm	7-Mar-02		15-Sep-03	
		Vol. collected mL	Description	Vol. collected mL	Description
HG-T2-75	surface	185	clear	370	clear
	0-12	250	strong orange	175	orange
	12-26	130	strong orange	60	orange
	26-57	184	faint yellow	124	orange
	57-75	no sample collected due to sand block the port		330	orange
LSH-T3-50	surface	480	clear	400	clear
	0-17.5	90	orange	29	light tea
	17.5-95.5	103	faint yellow	990	orange
HG-T2-0	surface	410	clear	540	clear
	0-13.5	210	strong orange	144	clear
	13.5-36	140	light yellow	144	light tea
	36-57.5	120	strong orange	168	brown
	57.5-72.5	180	strong orange	142	orange
	72.5-78.5	38	faint yellow	135	faint tea
HG-T1-290	surface	250	clear	200	clear
	0-12	270	strong orange	205	red brown
	12-62.5	550	light yellow	590	yellow
HG-T2-50	surface	510	clear	425	clear
	0-11	210	clear	98	light tea
	11-23	230	clear	63	clear
	23-48.5	440	clear	380	clear
	48.5-91	935	clear	970	clear
HG-T1-150	surface	280	clear	240	clear
	1-12.5	155	clear	50	clear
	12.5-41	415	clear	350	clear
	41-68.5	440	clear	775	clear
LSH-T3-75	surface	330	orange	425	light tea
	0-24	340	strong orange	165	red brown
	24-35	75	orange	34	orange
	35-49	230	orange	28	light tea
	49-57.5	no sample collected due to sand block the port		26	clear
	57.5-87			130	clear
HG 307C	surface	542	faint yellow	360	clear
	0-10.5	145	orange	123	orange
	10.5-19.5	128	orange	60	orange
	19.5-92	1090	light yellow	1460	orange

App2-Table 6: Sediment Bulk Density and Moisture Content, 18-Sep-2003

Transect	Stratum (cm)	Wet Density g/mL	Dry Density g/mL	Moisture %
HG-T2-75	0-7.5	1.08	0.91	18.8
	7.5-10.5	1.01	0.84	31
	10.5-12	0.99	1.16	17.4
	12-26	1.04	1.04	26.6
	26-57	1.28	0.60	65.2
	57-79	1.65	1.24	25.1
LSH-T3-50	0-7	0.94	0.70	25.4
	7-17.5	1.61	1.24	23
	17.5-100	1.09	1.51	7.1
HG-T2-0	0-8	0.96	0.98	15.1
	8-11.5	0.98	1.24	11.9
	11.5-50	1.51	1.21	19.8
	50-72.5	1.73	1.36	21.4
	72.5-83	1.46	1.26	13.3
HG-T1-290	0-8	0.66	0.5	49.7
	8-12	1.54	1.18	23.1
	12-27	1.27	1.71	10.1
	27-66.5	1.48	1.52	14.7
HG-T2-50	0-8	0.89	0.69	34.9
	8-9	0.93	1.1	20.7
	9-11	1.19	1.68	5.7
	11-21	1.09	1.57	4.1
	21-48.5	1.02	1.42	7.8
	48.5-96	1.56	1.62	13.7
HG-T1-150	0-2.5	1.13	1.35	9.9
	2.5-4	1.01	1.47	3.1
	4 -12.5	1.08	1.58	7.2
	12.5-41	1.2	1.64	8.6
	41-73	1.21	1.57	13.3
LSH-T3-75	0-24	0.86	0.54	47.9
	24-35	1.78	1.32	25.7
	35-49	1.44	1.74	19.7
	49-57.5	1.81	1.44	20.6
	57.5-91	2.14	1.76	17.7
HG 307C	0-10.5	0.83	0.99	20.9
	10.5-19.5	0.9	1.37	5.8
	19.5-96	1.25	1.69	10.1

App2-Table 7a: Top Water pH over Time

Location	8-Apr-99	24-Nov-99 *	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	10-Sep-02	15-Sep-03
HG - T1 - 150	6.08	5.59	4.35	4.62	7.23	7.01	5.95	5.91	5.31	5.34	4.55	4.87
HG - T1 - 290	3.60	6.00	3.05	3.54	2.75	3.52	3.42	3.49	3.67	3.79	3.60	3.76
HG - T2 - 0	2.94	dry	3.35	6.47	6.73	6.65	6.58	6.41	5.93	6.24	5.88	5.09
HG - T2 - 50	3.75	4.23	3.11	3.26	2.55	3.21	3.19	3.31	3.29	3.27	3.37	3.40
HG - T2 - 75	4.85	dry	3.59	4.27	5.98	6.61	6.58	6.71	6.57	6.53	5.79	5.52
LSH - T3 - 50	4.15	4.55	3.72	3.67	3.93	3.81	3.96	3.86	3.52	5.31	4.02	4.03
LSH - T3 - 75	3.95	4.51	4.26	4.36	6.24	6.46	6.53	6.44	6.59	6.19	5.79	6.30
HG-307C	4.03	4.22	4.63	6.21	6.53	6.36	6.34	6.52	6.45	6.30	5.99	6.24

* Water was drained for entire column through the bottom port.

App2-Table 7b: Pore Water pH after Column Sediment Flooded for 1065 and 1640 Days

Transect	Depth, cm	1065 days	1640 days
HG-T2-75	Top	6.53	5.52
	0-12	6.27	6.59
	12-26	5.91	6.52
	26-57	5.88	6.30
	57-75	NA	6.04
LSH-T3-50	Top	3.67	4.03
	0-17.5	5.31	6.05
	17.5-95.5	6.15	6.32
HG-T2-0	Top	6.24	5.09
	0-13.5	6.04	5.15
	13.5-36	4.61	3.27
	36-57.5	4.66	5.68
	57.5-72.5	4.04	3.88
	72.5-78.5	2.92	2.93
HG-T1-290	Top	3.79	3.76
	0-12	5.95	6.25
	12-62.5	5.93	6.29
HG-T2-50	Top	3.27	3.40
	0-11	4.68	3.63
	11-23	3.89	3.51
	23-48.5	3.40	3.37
	48.5-91	3.35	3.43
HG-T1-150	Top	5.34	4.87
	1-12.5	6.33	6.52
	12.5-41	5.69	5.89
	41-68.5	5.88	6.18
LSH-T3-75	Top	6.19	6.30
	0-24	6.35	6.77
	24-35	6.30	6.43
	35-49	4.99	6.49
	49-57.5	NA	5.34
	57.5-87	NA	5.00
HG 307C	Top	6.30	6.24
	0-10.5	6.08	6.27
	10.5-19.5	6.14	6.41
	19.5-92	6.78	5.34

NA: no water was collected due to the sediment block the port tubes.

App2-Table 7c: pH of Slurry made from Column Strata after Flooding for 1640 Days*

Transect	Stratum (cm)	I hour	24 hrs	changes in unit	Transect	Stratum (cm)	I hour	70 hrs	changes in unit
HG-T2-75	0-7.5	5.42	5.07	-0.35	HG-T2-50	0-8	3.78	3.62	-0.16
	7.5-10.5	5.73	4.50	-1.23		8-9	4.47	4.15	-0.32
	10.5-12	5.59	5.10	-0.49		9-11	5.67	5.40	-0.27
	12-26	5.64	5.18	-0.46		11-21	5.65	5.24	-0.41
	26-57	6.14	4.60	-1.54		21-48.5	5.34	4.89	-0.45
	57-79	5.37	4.91	-0.46		48.5-96	5.40	5.18	-0.22
LSH-T3-50	0-7	4.56	4.45	-0.11	HG-T1-150	0-2.5	5.62	5.51	-0.11
	7-17.5	5.13	4.26	-0.87		2.5-4	5.73	5.73	0
	17.5-100	5.85	5.60	-0.25		4 -12.5	6.09	5.98	-0.11
						12.5-41	6.11	6.09	-0.02
						41-73	6.33	6.51	0.18
		1 hour	24.5 hrs	changes in unit			1 hour	26.3 hrs	changes in unit
HG-T2-0	0-8	5.12	4.92	-0.20	LSH-T3-75	0-24	5.86	5.55	-0.31
	8-11.5	4.72	4.45	-0.27		24-35	6.42	5.93	-0.49
	11.5-50	4.58	4.11	-0.47		35-49	6.29	6.16	-0.13
	50-72.5	4.82	4.56	-0.26		49-57.5	6.30	5.64	-0.66
	72.5-83	4.33	3.96	-0.37		57.5-91	5.93	5.39	-0.54
HG-T1-290	0-8	4.63	4.39	-0.24	HG 307C	0-10.5	5.64	5.26	-0.38
	8-12	5.91	5.08	-0.83		10.5-19.5	6.42	5.93	-0.49
	12-27	5.4	5.25	-0.15		19.5-96	6.27	5.94	-0.33
	27-66.5	5.98	5.93	-0.05					

* For each depth, 40 g of wet homogenized sediment was used for the slurry pH determination.

App2-Table 8a: Top Water Acidity (mg/L, $CaCO_3$ equv.) over Time

Location	8-Apr-99	24-Nov-99 *	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	10-Sep-02	15-Sep-03
HG - T1 - 150	6.7	6.9	17.2	9.2	4.3	9.3	7.7	7.6	7.5	8.5	12.3	16.5
HG - T1 - 290	57.9	26	144.4	85.6	70.8	72.4	73.1	69.1	50.4	38.3	47.5	33.3
HG - T2 - 0	165	dry	52.3	16.6	18.5	20.6	14.7	9.2	16.5	14.6	27	36.4
HG - T2 - 50	17.9	12.4	67.8	68.3	63.3	68.8	63.2	62.3	66.1	62.7	52.8	50.8
HG - T2 - 75	37.9	dry	67.9	29.3	13.7	42.2	83.8	44.4	33.8	459.8	125.3	85.8
LSH - T3 - 50	16.3	7.9	86.6	63	33	23.4	19.4	28.2	59.3	42	35.8	19.1
LSH - T3 - 75	49	25.4	33.2	37.8	33.9	42.6	80.9	27.9	49.9	41.2	51.5	104.5
HG-307C	18.9	12.6	19.2	78.2	12.8	38.4	25.1	18.3	18.8	8	23.4	18

* Water was drained for entire column through the bottom port.

App2-Table 8b: Comparison of Pore Water Acidity (mg/L, CaCO3 equv.) over Depth after Column Sediment Flooded for 1065 and 1640 Days

Transect	Depth cm	Acidity, mg/L, $CaCO_3$ equv.		Transect	Depth cm	Acidity, mg/L, $CaCO_3$ equv.	
		1065 days	1640 days			1065 days	1640 days
HG-T2-75	top	459.8	85.8	HG-T2-50	top	62.7	50.8
	0-12	295.6	417.6		0-11	258.6	138.0
	12-26	411.4	377.6		11-23	16-Sep	140.7
	26-57	372.5	607.4		23-48.5	220.9	115.5
	57-75	NA	198.3		48.5-91	157.3	164.4
LSH-T3-50	top	42	19.1	HG-T1-150	top	8.5	16.5
	0-17.5	163.4	49.0		1-12.5	8.4	9.1
	17.5-95.5	13.5	89.4		12.5-41	32.3	19.6
					41-68.5	18.9	13.5
HG-T2-0	top	14.6	36.4	LSH-T3-75	top	41.2	104.5
	0-13.5	255.2	39.8		0-24	315.4	35.2
	13.5-36	1736.5	185.4		24-35	48.9	63.4
	36-57.5	1787.8	1478.7		35-49	78.1	54.8
	57.5-72.5	1583.3	1618.8		49-57.5	NA	28.8
	72.5-78.5	1373.1	1552.9		57.5-87	NA	22.8
HG-T1-290	top	38.3	33.3	HG 307C	top	8	18.0
	0-12	297.1	28.4		0-10.5	76.6	70.3
	12-62.5	233.2	139.7		10.5-19.5	68.8	53.1
					19.5-92	90	48.6

NA: no water was collected due to the sediment block the port tubes.

App2-Table 8c: Acidity (mg/L, CaCO3 equv.) of Slurry made from Column Sediments after Flooding for 1640 Days*

Transect	Stratum (cm)	I hour	24 hrs	changes in unit	Transect	Stratum (cm)	I hour	70 hrs	changes in unit
HG-T2-75	0-7.5	12.2	12.2	0	HG-T2-50	0-8	27.6	21	-6.6
	7.5-10.5	14.9	15.7	0.8		8-9	13.4	15	1.6
	10.5-12	8.3	8.8	0.5		9-11	6.5	7.2	0.7
	12-26	8.1	8.3	0.2		11-21	6.5	6.9	0.4
	26-57	56.3	23	-33.3		21-48.5	6.8	7.1	0.3
	57-79	28.9	57.6	28.7		48.5-96	6.6	7.1	0.5
LSH-T3-50	0-7	12.9	17.5	4.6	HG-T1-150	0-2.5	7.1	8.0	0.9
	7-17.5	15.1	16.7	1.6		2.5-4	6.4	6.4	0
	17.5-100	6.5	6.7	0.2		4 -12.5	6.2	6.3	0.1
						12.5-41	6.3	6.5	0.2
						41-73	6.0	6.3	0.3
		1 hour	24.5 hrs	changes in unit			1 hour	26.3 hrs	changes in unit
HG-T2-0	0-8	8.4	7.6	-0.8	LSH-T3-75	0-24	8.6	8.7	0.1
	8-11.5	9.0	7.9	-1.1		24-35	17.4	9.2	-8.2
	11.5-50	16.2	16.1	-0.1		35-49	9.8	6.5	-3.3
	50-72.5	75.2	78.2	3.0		49-57.5	11.90	10.8	-1.1
	72.5-83	78.9	84.3	5.4		57.5-91	6.9	7.0	0.1
HG-T1-290	0-8	13.6	13.9	0.3	HG 307C	0-10.5	7.1	10.3	3.2
	8-12	24.2	24.2	0		10.5-19.5	6.4	7.1	0.7
	12-27	6.7	6.7	0		19.5-96	6.4	6.3	-0.1
	27-66.5	6.4	6.4	0					

* For each depth, 40 g of wet homogenized sediment was used for the slurry acidity determination.

App2-Table 9a: Top Water Conductivity (uS/cm) over Time

Location	8-Apr-99	24-Nov-99 *	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	10-Sep-02	15-Sep-03
HG - T1 - 150	13	26.9	136	83	90	69	24	20	28.1	37.4	53.9	23.5
HG - T1 - 290	263	100.4	566	372	100	330	357	355	302	187	175.8	57.7
HG - T2 - 0	663	dry	364	218	250	268	162.1	55	62.3	52.5	68.5	46.9
HG - T2 - 50	100	52.7	550	464	110	434	413	375	408	318	245	288
HG - T2 - 75	246	dry	1113	523	100	358	431	285	176.2	100.6	102.4	80.1
LSH - T3 - 50	100	29.5	386	270	90	102	86.4	105	178	200	119.2	46.8
LSH - T3 - 75	128	85.1	512	271	100	451	444	185	168	123.7	147.3	94.1
HG-307C	241	40.6	83	181	100	223	122	65	119.4	29.5	72	17.3

* Water was drained for entire column through the bottom port.

App2-Table 9b: Changes in Conductivity of Pore Water over Depth after Column Sediment Flooded for 1065 and 1640 Days

Transect	Water depth cm	Conducitivity, uS/cm		Transect	Water depth cm	Conducitivity, uS/cm	
		7-Mar-02	15-Sep-03			7-Mar-02	15-Sep-03
HG-T2-75	top	100.6	80.1	HG-T2-50	top	318	288
	0-12	312	531		0-11	316	328
	12-26	386	654		11-23	29-Nov	369
	26-57	394	853		23-48.5	369	383
	57-75	NA	581		48.5-91	310	420
LSH-T3-50	top	158.3	468	HG-T1-150	top	37.4	23.5
	0-17.5	200	41.7		1-12.5	67.5	34.2
	17.5-95.5	31.6	72.4		12.5-41	36.8	26.5
					41-68.5	34	25.2
HG-T2-0	top	52.5	46.9	LSH-T3-75	top	123.7	94.1
	0-13.5	274	477		0-24	316	148.4
	13.5-36	687	459		24-35	200	182.8
	36-57.5	704	1616		35-49	146.2	156.8
	57.5-72.5	740	1773		49-57.5	NA	103.9
	72.5-78.5	1028	1959		57.5-87	NA	64.2
HG-T1-290	top	187	57.7	HG 307C	top	29.5	17.3
	0-12	315	69.9		0-10.5	117.5	68.7
	12-62.5	291	197.8		10.5-19.5	143.4	74.3
					19.5-92	125	58.6

NA: no water was collected due to the sediment block the port tubes.

App2-Table 9c: Conductivity (uS/cm) of Slurry made from Column strata after Flooding for 1640 Days*

Transect	Stratum (cm)	I hour	24 hrs	changes in unit	Transect	Stratum (cm)	I hour	70 hrs	changes in unit
HG-T2-75	0-7.5	16.3	19.2	2.9	HG-T2-50	0-8	63.8	85.1	21.3
	7.5-10.5	16.3	25.9	9.6		8-9	19	33	14
	10.5-12	18.48	16.5	-1.98		9-11	11.06	17.6	6.51
	12-26	15.3	18.4	3.1		11-21	11.6	12.62	1.02
	26-57	98.9	95	-3.9		21-48.5	15.07	14.1	-0.97
	57-79	49.5	51.0	1.50		48.5-96	14.3	18.74	4.4
LSH-T3-50	0-7	19.1	22.0	2.9	HG-T1-150	0-2.5	11.96	16.3	4.29
	7-17.5	18.4	28.5	10.1		2.5-4	11.15	7.1	-4.05
	17.5-100	11.94	14.9	2.96		4 -12.5	9.91	13.22	3.31
						12.5-41	10.24	8	-2.24
						41-73	9.3	13.36	4.04
		1 hour	24.5 hrs	changes in unit			1 hour	26.3 hrs	changes in unit
HG-T2-0	0-8	12.5	16.3	3.8	LSH-T3-75	0-24	14.8	17.3	2.5
	8-11.5	17.8	23.2	5.4		24-35	25	16.5	-8.5
	11.5-50	24.7	33.8	9.1		35-49	18.7	18.49	-0.21
	50-72.5	100.5	104.6	4.1		49-57.5	13.50	16	2.5
	72.5-83	107.4	126.8	19.4		57.5-91	18.78	18.3	-0.53
HG-T1-290	0-8	23.4	31.8	8.4	HG 307C	0-10.5	15.16	16.11	0.95
	8-12	8.7	12.3	3.6		10.5-19.5	11.28	11.26	-0.02
	12-27	17.3	11.6	-5.7		19.5-96	6.2	11.1	4.9
	27-66.5	12.64	9.2	-3.44					

* For each depth, 40 g of wet homogenized sediment was used for the slurry conductivity determination.

App2-Table 10a: Top Water Eh (mv) over Time

Location	8-Apr-99	24-Nov-99 *	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	10-Sep-02	15-Sep-03
HG - T2 - 75	626	dry	512	393	443	483	107	221	284	301	370	492
LSH - T3 - 50	615	436	646	451	519	631	420	541	535	506	572	452
HG - T2 - 0	621	dry	644	249	444	529	259	410	429	312	446	414
HG - T1 - 290	622	285	598	346	629	617	457	605	489	550	676	486
HG - T2 - 50	614	475	671	453	553	591	488	4376	591	458	703	541
HG - T1 - 150	422	358	522	347	392	564	417	543	418	439	567	498
LSH - T3 - 75	625	389	630	410	318	469	132	265	199	304	324	294
HG-307C	635	454	629	186	180	454	199	314	186	298	319	317

* Water was drained for entire column through the bottom port.

App2-Table 10b: Changes in Eh (mv) of Pore Water over Depth after Column Strata Flooded for 1065 and 1640 Days

Transect	Water depth cm	Eh, mv		Transect	Water depth cm	Eh, mv	
		7-Mar-02	15-Sep-03			7-Mar-02	15-Sep-03
HG-T2-75	top	301	492	HG-T2-50	top	458	541
	0-12	173	80		0-11	389	459
	12-26	242	89		11-23	494	585
	26-57	259	118		23-48.5	527	619
	57-75	NA	300		48.5-91	534	597
LSH-T3-50	top	506	452	HG-T1-150	top	439	498
	0-17.5	331	304		1-12.5	402	223
	17.5-95.5	272	219		12.5-41	421	468
					41-68.5	394	394
HG-T2-0	top	312	414	LSH-T3-75	top	304	294
	0-13.5	228	453		0-24	144	404
	13.5-36	374	641		24-35	212	214
	36-57.5	375	275		35-49	340	210
	57.5-72.5	434	469		49-57.5	NA	336
	72.5-78.5	545	623		57.5-87	NA	455
HG-T1-290	top	550	586	HG 307C	top	298	317
	0-12	242	296		0-10.5	263	228
	12-62.5	244	216		10.5-19.5	246	217
					19.5-92	224	281

NA: no water was collected due to the sediment block the port tubes.

App2-Table 10c: Eh (mv) of Slurry made from Column Sediment after Flooding for 1640 Days*

<table>
<tr><th>Transect</th><th>Stratum (cm)</th><th>I hour</th><th>24 hrs</th><th>changes in unit</th><th>Transect</th><th>Stratum (cm)</th><th>I hour</th><th>70 hrs</th><th>changes in unit</th></tr>
<tr><td rowspan="6">HG-T2-75</td><td>0-7.5</td><td>594</td><td>690</td><td>96</td><td rowspan="6">HG-T2-50</td><td>0-8</td><td>604</td><td>670</td><td>66</td></tr>
<tr><td>7.5-10.5</td><td>489</td><td>701</td><td>212</td><td>8-9</td><td>760</td><td>738</td><td>-22</td></tr>
<tr><td>10.5-12</td><td>536</td><td>689</td><td>153</td><td>9-11</td><td>716</td><td>628</td><td>-88</td></tr>
<tr><td>12-26</td><td>506</td><td>662</td><td>156</td><td>11-21</td><td>743</td><td>661</td><td>-82</td></tr>
<tr><td>26-57</td><td>492</td><td>652</td><td>160</td><td>21-48.5</td><td>756</td><td>690</td><td>-66</td></tr>
<tr><td>57-79</td><td>512</td><td>592</td><td>80</td><td>48.5-96</td><td>742</td><td>668</td><td>-74</td></tr>
<tr><td rowspan="5">LSH-T3-50</td><td>0-7</td><td>563</td><td>628</td><td>65</td><td rowspan="5">HG-T1-150</td><td>0-2.5</td><td>701</td><td>639</td><td>-62</td></tr>
<tr><td>7-17.5</td><td>603</td><td>674</td><td>71</td><td>2.5-4</td><td>625</td><td>681</td><td>56</td></tr>
<tr><td>17.5-100</td><td>621</td><td>634</td><td>13</td><td>4 -12.5</td><td>703</td><td>633</td><td>-70</td></tr>
<tr><td></td><td></td><td></td><td></td><td>12.5-41</td><td>653</td><td>670</td><td>17</td></tr>
<tr><td></td><td></td><td></td><td></td><td>41-73</td><td>668</td><td>659</td><td>-9</td></tr>
<tr><td></td><td></td><td>1 hour</td><td>24.5 hrs</td><td>changes in unit</td><td></td><td></td><td>1 hour</td><td>26.3 hrs</td><td>changes in unit</td></tr>
<tr><td rowspan="5">HG-T2-0</td><td>0-8</td><td>678</td><td>566</td><td>-112</td><td rowspan="5">LSH-T3-75</td><td>0-24</td><td>516</td><td>602</td><td>86</td></tr>
<tr><td>8-11.5</td><td>642</td><td>552</td><td>-90</td><td>24-35</td><td>470</td><td>528</td><td>59</td></tr>
<tr><td>11.5-50</td><td>637</td><td>632</td><td>-5</td><td>35-49</td><td>453</td><td>524</td><td>71</td></tr>
<tr><td>50-72.5</td><td>535</td><td>581</td><td>46</td><td>49-57.5</td><td>557</td><td>570</td><td>13</td></tr>
<tr><td>72.5-83</td><td>581</td><td>622</td><td>41</td><td>57.5-91</td><td>637</td><td>586</td><td>-50</td></tr>
<tr><td rowspan="4">HG-T1-290</td><td>0-8</td><td>678</td><td>478</td><td>-200</td><td rowspan="4">HG 307C</td><td>0-10.5</td><td>554</td><td>606</td><td>53</td></tr>
<tr><td>8-12</td><td>469</td><td>416</td><td>-53</td><td>10.5-19.5</td><td>691</td><td>588</td><td>-102</td></tr>
<tr><td>12-27</td><td>676</td><td>533</td><td>-143</td><td>19.5-96</td><td>576</td><td>599</td><td>23</td></tr>
<tr><td>27-66.5</td><td>586</td><td>487</td><td>-99</td><td></td><td></td><td></td><td></td></tr>
</table>

* For each depth, 40 g of wet homogenized sediment was used for the slurry Eh determination.

App2-Table 11a: [Ni] (mg/L) Released to Surface Water from Strata over Time

Location	8-Apr-99	24-Nov-99*	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	10-Sep-02	15-Sep-03
Ni, mg/L (analysed by SRC)												
HG - T1 - 150	0.005	NA	0.210	0.10	0.030	0.015	0.009	0.008	0.001	0.004	0.118	0.017
HG - T1 - 290	0.69	NA	1.30	NA	0.71	0.52	0.46	0.33	0.11	0.053	0.256	0.045
HG - T2 - 0	0.02	NA	0.140	0.056	0.012	0.006	0.011	0.008	0.006	0.004	0.272	0.027
HG - T2 - 50	0.058	0.021	NA	1.50	1.30	0.94	0.88	0.97	0.94	0.68	0.464	0.29
HG - T2 - 75	0.23	NA	22	NA	0.46	1.40	0.86	0.46	0.38	0.25	0.671	0.44
LSH - T3 - 50	1.20	0.094	3.90	2.80	1.70	0.71	0.64	0.89	1.00	0.59	0.617	0.14
LSH - T3 - 75	4.40	1.00	3.20	0.46	1.70	1.50	1.20	0.64	0.84	0.35	1.048	0.35
HG 307 C	0.38	0.032	0.130	0.29	0.24	0.17	0.11	0.052	0.037	0.01	0.64	0.012
Ni, mg/L (analysed by Boojum)												
HG - T1 - 150	0.090	0.075	0.570	0.225	0.907	0.508	0.109	0.078	0.063	0.0266		0.057
HG - T1 - 290	0.907	0.071	1.95	1.33	0.815	0.631	0.539	0.416	0.447	0.0716		0.109
HG - T2 - 0	0.367	dry	0.570	0.278	0.697	0.359	0.436	0.146	0.256	0.0766		0.130
HG - T2 - 50	0.106	0.075	1.60	1.71	1.46	1.09	0.969	1.10	1.11	0.292		0.382
HG - T2 - 75	0.594	dry	4.50	5.23	0.732	3.00	1.93	1.13	1.50	0.348		0.677
LSH - T3 - 50	1.41	2.23	5.79	3.37	1.80	0.754	0.846	1.08	1.31	0.269		0.232
LSH - T3 - 75	4.90	3.40	0.717	1.14	2.57	2.69	3.00	1.27	3.42	0.283		0.576
HG 307 C	0.545	0.087	0.348	2.70	0.723	1.34	1.24	0.232	1.51	0.223		0.161

NA: Due to not enough water samples.

*Water was drained for entire column through the bottom port.

App2-Table 11b: Pore Water [Ni] (mg/L) over Depth after Column Strata Flooded for 1065 and 1640 Days

Transect	Depth cm	1065 days		1640 days		Transect	Depth cm	1065 days		1640 days	
		[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)	[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)			[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)	[Ni], mg/L (Boojum data)	[Ni], mg/L (SRC data)
HG-T2-75	top	0.348	0.25	0.677	0.440	HG-T2-50	top	0.292	0.68	0.382	0.290
	0-12	0.833	0.36	1.95	0.18		0-11	0.372	0.300	0.359	0.230
	12-26	1.48	1.7	no sample	0.86		11-23	0-Jan	0.360	0.436	0.190
	26-57	1.86	0.43	4.43	0.34		23-48.5	0.197	0.380	0.544	0.290
	57-75	NA	NA	2.56	0.22		48.5-91	0.215	0.500	0.697	0.490
LSH-T3-50	top	0.269	0.59	0.232	0.140	HG-T1-150	top	0.0266	0.004	0.057	0.017
	0-5.5	0.383	0.17	no sample	0.07		0-12.5	0.114	0.038	0.233	0.035
	5.5-8.3	0.118	0.026	0.05	0.02		12.5-41	0.0416	0.024	0.047	0.032
							41-68.5	0.0416	0.008	0.078	0.006
HG-T2-0	top	0.077	0.004	0.13	0.027	LSH-T3-75	top	0.283	0.350	0.576	0.35
	0-13.5	0.108	0.003	2.33	0.320		0-24	0.258	0.130	0.473	0.053
	13.5-36	4.44	0.042	0.32	0.024		24-35	0.133	0.310	0.175	0.12
	36-57.5	3.63	0.011	17.9	0.016		35-49	0.533	0.500	0.344	0.35
	57.5-72.5	3.58	0.062	16.4	0.047					no sample	0.333
	72.5-78.5	2.56	0.089	18.6	0.064					0.697	0.45
HG-T1-290	top	0.072	0.053	0.109	0.045	HG 307C	top	0.223	0.010	0.161	0.012
	0-13	0.108	0.055	0.798	0.017		0-10.5	0.0928	0.002	0.236	0.004
	13-63.5	0.683	0.004	0.544	0.002		10.5-19.5	0.0978	0.002	0.236	<0.01
							19.5-92	0.243	0.007	0.390	0.006

App2-Table 11c: [Ni] (mg/L) of Slurry made from Column Strata after Flooding for 1640 Days*

Transect	Stratum (cm)	I hrs	24 hrs	Transect	Stratum (cm)	1 hrs	70 hrs
HG-T2-75	0-7.5	<0.001	0.103	HG-T2-50	0-8	1.004	0.0473
	7.5-10.5	<0.001	0.078		8-9	0.390	0.0166
	10.5-12	<0.001	<0.001		9-11	0.0828	<0.001
	12-26	<0.001	<0.001		11-21	<0.001	0.032
	26-57	0.279	0.186		21-48.5	0.298	0.057
	57-79	0.201	0.2		48.5-96	<0.001	0.05
LSH-T3-50	0-7	0.017	<0.001	HG-T1-150	0-2.5	<0.001	0.072
	7-17.5	<0.001	<0.001		2.5-4	<0.001	0.053
	17.5-100	<0.001	<0.001		4 -12.5	0.221	0.047
					12.5-41	0.236	0.041
					41-73	0.2	0.035
Transect	**Stratum (cm)**	**1 hour**	**24.5 hrs**	**Transect**	**Stratum (cm)**	**1 hour**	**26.3 hrs**
HG-T2-0	0-8	0.038	0.007	LSH-T3-75	0-24	<0.001	<0.001
	8-11.5	0.124	0.401		24-35	<0.001	0.017
	11.5-50	0.170	0.483		35-49	0.160	<0.001
	50-72.5	0.401	0.093		49-57.5	<0.001	<0.001
	72.5-83	0.742	0.646		57.5-91	<0.001	<0.001
HG-T1-290	0-8	<0.001	<0.001	HG 307C	0-10.5	<0.001	<0.001
	8-12	<0.001	0.033		10.5-19.5	<0.001	<0.001
	12-27	0.112	0.056		19.5-96	0.236	0.0319
	27-66.5	0.017	0.026				

* For each depth, 40 g of wet homogenized sediment was used for the slurry Ni determination.

App2-Table 12: Metals Released to Top Water from Column Strata During Leaching Experiment (SRC Data)

Location	7-Apr-99	24-Nov-99	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	15-Sep-03
Ni, mg/l											
HG-T1-150	0.005	NA	0.210	0.10	0.03	0.015	0.009	0.008	0.001	0.004	0.017
HG-T1-290	0.69	NA	1.30	NA	0.71	0.52	0.46	0.33	0.11	0.053	0.045
HG-T2-0	0.02	NA	22	NA	0.012	0.006	0.011	0.008	0.006	0.25	0.027
HG-T2-50	0.058	0.094	3.90	2.80	1.3	0.94	0.88	0.97	0.94	0.59	0.29
HG-T2-75	0.23	1.00	3.20	0.46	0.46	1.4	0.86	0.46	0.38	0.35	0.44
LSH-T3-50	1.2	NA	0.140	0.056	1.7	0.71	0.64	0.89	1	0.004	0.14
LSH-T3-75	4.4	0.021	NA	1.50	1.7	1.5	1.2	0.64	0.84	0.68	0.35
HG 307C	0.38	0.032	0.130	0.29	0.24	0.17	0.11	0.052	0.037	0.01	0.012
Al, mg/l											
HG-T1-150	<0.005	NA	0.14	0.036	0.024	0.017	0.011	0.043	0.011	0.014	0.31
HG-T1-290	3.9	NA	17	NA	6.7	6	5.3	4.2	0.73	0.35	0.33
HG-T2-0	1.5	NA	0.94	NA	0.05	0.026	0.039	0.034	0.006	0.006	0.027
HG-T2-50	0.28	0.027	7.8	4.8	0.93	0.69	0.62	0.79	0.8	2.8	0.18
HG-T2-75	0.095	0.18	0.58	0.37	0.096	0.029	0.007	0.021	<0.005	0.006	
LSH-T3-50	0.43	NA	1.2	0.2	2.20	0.76	0.71	1.8	4.6	0.007	0.3
LSH-T3-75	1.4	0.1	NA	0.94	0.26	0.12	0.06	0.027	0.008	0.6	0.017
HG 307C	0.63	0.064	0.082	0.079	0.054	<0.005	0.007	0.01	<0.005	0.006	0.016
Fe, mg/l											
HG-T1-150	0.013	NA	0.021	0.004	0.49	0.1	0.019	0.026	0.006	0.041	0.22
HG-T1-290	0.25	NA	0.34	NA	0.81	2.8	1.47	1.3	0.52	1.8	0.28
HG-T2-0	28	NA	0.063	NA	20	23	28	1.1	0.028	1.2	0.088
HG-T2-50	0.044	0.008	0.16	0.094	0.69	0.59	0.49	0.45	0.42	0.33	0.45
HG-T2-75	0.031	0.019	0.058	0.15	0.57	6.5	31	7.7	0.82	2.4	
LSH-T3-50	0.02	NA	1.1	31	0.55	0.07	0.18	0.15	0.13	0.27	0.13
LSH-T3-75	0.025	0.019	NA	0.58	54	51	49	13	14	0.69	10.1
HG 307C	0.018	0.01	0.011	51	56	25	8	3.9	2.8	0.71	0.24
S, mg/l											
HG-T1-150	0.31	NA	0.5	1.5	0.96	3.6	1.1	1.1	1.9	3	2.3
HG-T1-290	9.1	NA	14	NA	40	37	39	43	39	21	2.9
HG-T2-0	45	NA	2.7	NA	2	0.94	2	0.79	0.8	0.85	4.8
HG-T2-50	7.2	1.9	6	8.1	41	34	33	36	44	14	26
HG-T2-75	37	6.4	16	26	18	3.9	1.7	3	0.74	1.5	
LSH-T3-50	8.3	NA	38	2.6	11	7.4	7.5	11	20	0.6	5.1
LSH-T3-75	17	5	NA	41	3.5	2.6	2.1	1.8	1.9	37	1
HG 307C	14	3.4	8.7	1.9	0.82	0.32	0.71	0.22	0.16	0.37	0.3

App2-Table 12: Metals Released to Top Water from Column Strata During Leaching Experiment (SRC Data)

Location	7-Apr-99	24-Nov-99	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	15-Sep-03
Mn, mg/l											
HG-T1-150	0.044	NA	1.2	0.33	20	11	0.95	0.26	0.025	0.051	0.086
HG-T1-290	1.4	NA	1.5	NA	0.9	0.7	0.65	0.062	0.4	0.24	0.19
HG-T2-0	0.056	NA	72	NA	15	9.9	7.2	2.2	2.8	9	1.83
HG-T2-50	0.12	0.16	6.8	7.2	1.7	1.3	1.2	1.4	1.5	2.6	0.58
HG-T2-75	11	0.91	13	3.8	6.6	29	24	16	14	6.7	
LSH-T3-50	1.5	NA	3.9	7.4	5.8	2.6	2.2	2.9	4.1	2.1	1.04
LSH-T3-75	4.1	0.068	NA	1.9	17	16	14	8.8	12	1.2	6.19
HG 307C	1.7	0.22	0.85	5.9	16	10	7.3	3.8	4.8	1.3	1.36
Cd, mg/l											
HG-T1-150	0.007	NA	0.007	0.011	0.03	0.015	0.012	0.014	0.004	0.004	0.018
HG-T1-290	0.01	NA	0.015	NA	0.026	0.016	0.021	0.028	0.006	0.012	0.01
HG-T2-0	0.009	NA	0.051	NA	0.008	0.014	0.014	0.037	0.004	0.004	0.023
HG-T2-50	0.004	0.007	0.021	0.018	0.026	0.016	0.012	0.024	0.006	0.005	0.017
HG-T2-75	0.005	0.013	0.017	0.009	0.027	0.021	0.016	0.03	0.005	0.006	
LSH-T3-50	0.008	NA	0.005	0.006	0.014	0.02	0.016	0.02	0.007	0.006	0.008
LSH-T3-75	0.012	0.006	NA	0.011	0.020	0.014	0.018	0.022	0.006	0.007	0.013
HG 307C	0.007	0.005	0.002	0.008	0.024	0.011	0.016	0.012	0.006	0.004	0.029
Co, mg/l											
HG-T1-150	<0.001	NA	<0.001	<0.001	0.004	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
HG-T1-290	0.053	NA	0.076	NA	0.074	0.06	0.059	0.046	0.018	0.01	0.006
HG-T2-0	0.004	NA	1	NA	<0.005	<0.001	<0.001	<0.001	<0.001	0.024	0.002
HG-T2-50	0.014	0.0014	0.53	0.49	0.23	0.17	0.16	0.19	0.2	0.15	0.069
HG-T2-75	0.086	0.1	0.34	0.054	0.008	0.18	0.11	0.055	0.042	0.047	
LSH-T3-50	0.12	NA	0.013	0.007	0.36	0.16	0.15	0.02	0.26	<0.001	0.039
LSH-T3-75	0.4	0.007	NA	0.26	0.24	0.24	0.19	0.087	0.1	0.15	0.043
HG 307C	0.037	0.009	0.001	0.02	0.028	0.022	0.013	0.005	0.004	<0.001	<0.001
Cu, mg/l											
HG-T1-150	0.017	NA	0.035	0.059	0.016	0.004	0.012	0.006	<0.001	0.002	0.009
HG-T1-290	0.046	NA	0.043	NA	0.035	0.076	0.049	0.057	0.039	0.019	0.011
HG-T2-0	0.086	NA	0.02	NA	0.005	0.051	0.026	<0.013	0.003	0.01	0.004
HG-T2-50	0.079	0.004	0.029	0.032	0.042	0.074	0.036	0.026	0.028	0.04	0.013
HG-T2-75	0.018	0.023	0.024	0.031	0.014	0.17	0.028	0.004	0.005	0.011	
LSH-T3-50	0.052	NA	0.023	0.022	0.016	0.063	0.047	0.031	0.031	0.011	0.006
LSH-T3-75	0.094	0.014	NA	0.087	0.011	0.012	0.02	0.016	0.002	0.03	0.016
HG 307C	0.052	0.018	0.022	0.011	<0.005	0.009	0.006	0.005	0.005	0.003	0.008

App2-Table 12: Metals Released to Top Water from Column Strata During Leaching Experiment (SRC Data)

Location	7-Apr-99	24-Nov-99	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	15-Sep-03
B, mg/l											
HG-T1-150	0.011	NA	0.012	0.017	0.008	0.01	0.015	0.013	0.019	0.017	0.05
HG-T1-290	0.1	NA	0.12	NA	0.14	0.11	0.1	0.063	0.035	0.025	0.049
HG-T2-0	0.027	NA	0.038	NA	<0.01	0.014	0.006	<0.002	<0.002	0.007	0.033
HG-T2-50	0.022	0.013	0.043	0.037	0.061	0.048	0.05	0.043	0.054	0.017	0.069
HG-T2-75	0.03	0.057	0.13	0.11	0.017	0.02	0.02	0.003	0.008	0.018	
LSH-T3-50	0.038	NA	0.01	<0.002	0.06	0.04	0.031	0.025	0.024	<0.002	0.036
LSH-T3-75	0.13	0.019	NA	0.049	0.02	0.034	0.029	0.025	0.013	0.042	0.028
HG 307C	0.05	0.015	0.023	0.004	<0.01	0.008	0.008	<0.002	0.003	0.006	0.02
Ba, mg/l											
HG-T1-150	0.009	NA	0.57	0.25	0.41	0.26	0.03	0.023	0.068	0.15	0.25
HG-T1-290	0.13	NA	0.15	NA	0.076	0.064	0.075	0.078	0.04	0.042	0.094
HG-T2-0	0.055	NA	2.1	NA	0	0.15	0.15	0.056	0.063	0.098	0.076
HG-T2-50	0.019	0.056	0.32	0.22	0.053	0.05	0.06	0.074	0.059	0.088	0.081
HG-T2-75	0.06	0.35	0.17	0.071	0.11	0.26	0.22	0.13	0.15	0.097	
LSH-T3-50	0.078	NA	0.052	0.22	0.13	0.13	0.17	0.18	0.11	0.05	0.11
LSH-T3-75	0.075	0.046	NA	0.062	0.3	0.21	0.19	0.12	0.14	0.048	0.096
HG 307C	0.19	0.028	0.052	0.16	0.24	0.19	0.14	0.077	0.1	0.044	0.055
Ca, mg/l											
HG-T1-150	0.7	NA	8	4.9	7.10	3.4	1.7	1.3	1.8	2.5	2.9
HG-T1-290	9	NA	13	NA	5.9	4.1	3.8	3.8	1.8	1.7	1.7
HG-T2-0	2	NA	95	NA	24.0	14	10	3.4	3.6	8.1	5.6
HG-T2-50	2	1.2	12	8.5	7.1	5.2	5.1	6.1	7	3.3	4.1
HG-T2-75	27	6.3	27	7.6	7.1	30	26	19	12	9.4	
LSH-T3-50	4.8	NA	16	17	6	2.8	2.7	3.3	4.2	3.3	2.3
LSH-T3-75	15	2.3	NA	7	32.0	27	24	13	17	6.1	10
HG 307C	4.5	1.4	4.2	12	22	13	10	4.9	6.3	2	2.3
K, mg/l											
HG-T1-150	0.8	NA	32	12	5.4	3.2	2.5	1.7	2	2	0.7
HG-T1-290	2.5	NA	9.2	NA	3.2	2.3	2.5	2.4	2.2	1.7	0.9
HG-T2-0	1	NA	19	NA	13	7.1	5.6	3.8	4.1	4.2	0.9
HG-T2-50	0.7	4.5	4.9	9.3	2.6	2.2	2.6	3.1	4.3	2.8	2.1
HG-T2-75	2.1	17	20	17	8.3	7.1	7.5	6.8	3.9	7.6	
LSH-T3-50	1.8	NA	13	22	4.2	2.1	2.3	2.1	2.5	3.7	1.1
LSH-T3-75	2.6	1.1	NA	6.1	22	13	11	8.7	8.8	3.6	4.8
HG 307C	2.6	2.5	8.7	18	9.3	5	3.9	3.1	3.4	2.7	0.6

App2-Table 12: Metals Released to Top Water from Column Strata During Leaching Experiment (SRC Data)

Location	7-Apr-99	24-Nov-99	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	15-Sep-03
Mg, mg/l											
HG-T1-150	0.1	NA	1.9	1.4	2.1	1	0.5	0.4	0.5	0.7	0.7
HG-T1-290	1.6	NA	2.5	NA	1.4	1	1	1.2	0.8	0.7	0.6
HG-T2-0	0.4	NA	14	NA	6.1	3.5	2.3	0.9	1.3	1.8	1.5
HG-T2-50	0.5	0.1	1.5	1.1	1.5	1.1	1.1	1.5	2.2	0.8	1.3
HG-T2-75	6.5	0.8	5.9	1.8	1.7	6.4	4.6	3.4	2.6	1.8	
LSH-T3-50	0.5	NA	4.4	5	0.9	0.4	0.4	0.5	0.9	1.2	0.7
LSH-T3-75	2.3	0.5	NA	1.3	6.4	4.8	3.7	2.4	3	1.9	2
HG 307C	1	0.3	1	3.1	4	2.2	1.6	0.9	1.1	0.4	0.4
Na, mg/l											
HG-T1-150	0.7	NA	2	1.5	2.1	1	1.2	1.3	0.8	1	1.4
HG-T1-290	3.7	NA	5.4	NA	5.1	3.6	4	4	2.8	2.3	1.9
HG-T2-0	1.9	NA	6.2	NA	6.1	2.8	3	2.2	2.1	2	0.9
HG-T2-50	1.8	2.4	6	4.9	4.6	2.9	3	3.6	4.3	2.7	2.6
HG-T2-75	2.4	3.9	4.3	3.2	4.5	2.9	2.7	2.5	2.1	2.4	
LSH-T3-50	3.1	NA	3.9	4.3	6.2	2.6	2.6	3	3.3	1.9	2.7
LSH-T3-75	3.4	2.2	NA	3.9	4.7	2.8	2.8	2.4	2.7	4	2.2
HG 307C	4.2	1.3	2.3	2.8	3.6	1.3	1.3	1.2	1	0.9	0.9
Si, mg/l											
HG-T1-150	2.7	NA	7.2	11	6.8	7.3	8.5	9.3	11	10	9.7
HG-T1-290	28	NA	34	NA	47	40	42	43	40	30	21.2
HG-T2-0	20	NA	40	NA	19	16	16	14	15	13	3.1
HG-T2-50	13	8.9	24	26	71	63	64	65	72	19	62.5
HG-T2-75	32	19	33	35	36	16	13	9.9	11	10	
LSH-T3-50	18	NA	35	31	29	17	16	20	25	14	18.2
LSH-T3-75	33	19	NA	66	29	19	15	11	11	64	10.2
HG 307C	41	19	29	29	18	13	11	12	11	10	9.3
Sr, mg/l											
HG-T1-150	0.007	NA	0.093	0.057	0.081	0.04	0.018	0.015	0.022	0.032	0.028
HG-T1-290	0.12	NA	0.19	NA	0.086	0.064	0.061	0.055	0.026	0.02	0.02
HG-T2-0	0.031	NA	0.84	NA	0.24	0.15	0.11	0.034	0.041	0.073	0.057
HG-T2-50	0.022	0.013	0.18	0.12	0.087	0.068	<0.068	0.08	0.092	0.047	0.045
HG-T2-75	0.1	0.1	0.24	0.067	0.054	0.25	0.22	0.14	0.11	0.095	
LSH-T3-50	0.064	NA	0.17	0.17	0.078	0.039	0.037	0.047	0.063	0.036	0.026
LSH-T3-75	0.19	0.021	NA	0.087	0.31	0.27	0.23	0.13	0.17	0.076	0.097
HG 307C	0.063	0.011	0.039	0.12	0.22	0.14	0.11	0.054	0.072	0.021	0.022

App2-Table 12: Metals Released to Top Water from Column Strata During Leaching Experiment (SRC Data)

Location	7-Apr-99	24-Nov-99	26-Nov-99	20-Jan-00	11-May-00	22-Jun-00	9-Aug-00	29-Nov-00	5-Oct-01	7-Mar-02	15-Sep-03
Zn, mg/l											
HG-T1-150	0.034	NA	0.21	0.31	0.054	0.01	0.04	0.048	0.008	0.046	0.021
HG-T1-290	0.88	NA	1.4	NA	0.82	0.67	0.52	0.42	0.14	0.098	0.044
HG-T2-0	0.89	NA	8.5	NA	0.038	0.023	0.055	0.024	0.02	0.06	0.1
HG-T2-50	0.98	0.65	1.9	1.4	0.89	0.7	0.63	0.74	0.88	0.34	0.3
HG-T2-75	0.11	3.7	2	0.5	0.35	0.29	0.027	0.099	0.043	0.038	
LSH-T3-50	0.75	NA	0.97	0.056	0.86	0.46	0.38	0.57	0.62	0.036	0.14
LSH-T3-75	8.5	2.1	NA	0.9	0.093	0.021	0.043	0.032	0.035	0.73	0.03
HG 307C	3.7	1.6	0.87	0.042	<0.025	0.009	0.013	0.014	0.008	0.032	0.024

NA: Not enough samples.

App2-Table 13a: Metal Concentration (mg/L) in Water over Depth after Flooding for 1065 and 1640 days

(Greater than Detection Limit)

Location	Depth cm	Al		Ca		Fe		K		Mg		Mn		Na	
		1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)
HG T1-150	top	0.014	0.31	2.5	2.9	0.041	0.22	2	0.7	0.7	0.7	0.051	0.086	1	1.4
	0-12.5	<0.005	0.03	3.7	2.8	0.006	0.19	2.2	1.2	0.9	0.7	7.8	3.75	1.1	1.4
	12.5-41	0.019	0.029	3.3	5.5	0.016	0.013	1.3	1.1	0.8	1.4	0.1	0.18	1.6	2.2
	41-68.5	<0.005	0.033	2.8	6.2	0.003	0.03	0.8	0.8	0.8	1.8	0.094	0.053	1.4	2.7
HG T1-290	top	0.35	0.33	1.7	1.7	1.8	0.28	1.7	0.9	0.7	0.6	0.24	0.19	2.3	1.9
	0-13	0.25	0.029	3.7	2.6	140	125	2.5	1.6	1.2	0.8	0.3	0.21	2.5	2.2
	13-63.5	0.038	0.035	11	7.3	100	43	4.2	8	3.7	2.9	0.5	0.34	2.9	2.5
HG T2-0	top	0.007	0.027	3.3	5.6	0.27	0.088	3.7	0.9	1.2	1.5	2.1	1.83	1.9	0.9
	0-13.5	0.067	0.61	14	48	70	0.11	5.7	5.6	5	5.7	2.2	44.2	2.8	2.4
	13.5-36	0.01	0.24	8.3	3.5	920	27.4	6.3	2.1	6	1.5	0.78	0.36	4.2	1.8
	36-57.5	0.023	0.019	4.4	3.7	910	948	7	4.3	5.4	4.3	0.38	0.46	4.8	3.6
	57.5-72.5	2.4	2.8	4.6	5.2	790	1020	6.4	5.8	6.2	6.5	0.41	0.6	5	4.8
	72.5-78.5	9.5	7.7	5.1	6	610	869	5.9	5.6	6.9	7.4	0.44	0.56	5.7	5.4
HG T2-50	top	0.6	0.18	6.1	4.1	0.69	0.45	3.6	2.1	1.9	1.3	1.2	0.58	4	2.6
	0-11	0.53	1.6	5	4.7	110	17.6	3.2	2.4	1.6	1.5	0.8	0.051	3.3	2.4
	11-23	2	2.4	6.2	10	110	35.9	3.4	2	1.9	3	0.97	0.52	3.7	<5
	23-48.5	6.8	8	8.2	15	51	0.19	2.7	2.7	2.4	4.3	0.96	0.76	4.3	5.9
	48.5-91	14	15.4	11	16	3.6	0.16	2.3	2.7	2.6	3.9	1.1	1.19	4.8	5.8
HG T2-75	top	0.006		8.1		1.2		4.2		1.8		9		2	
	0-12	<0.005		12		87		4.1		3.3		21		2.4	
	12-26	<0.005		15		140		3.7		4.8		15		3	
	26-57	<0.005	<0.005	46	42	140	222	2.7	2.2	13	12	43	37.6	2.5	2.4
	57-75		<0.005		47		56		2.7		12		63.3		2.4
LSH T3-50	top	2.8	0.3	3.3	2.3	0.33	0.13	2.8	1.1	0.8	0.7	2.6	1.04	2.7	2.7
	0-17.5	0.18		3.6	4	92	37.3	2.1	3	0.7	<1	1.8	0.87	2.3	<5
	17.5-95.5	0.011	1	1.1	2.4	4.1	31.4	5.3	0.7	0.3	0.5	0.13	0.41	1.5	1.5
LSH T3-75	top	0.006	0.017	9.4	10	2.4	10.1	7.6	4.8	1.8	2	6.7	6.19	2.4	2.2
	0-24	0.15	0.05	9.8	11	160	105	7.5	6.3	2.3	2.7	4.9	4.34	3	3.6
	24-35	<0.005	0.08	11	11	36	106	6.9	4	2	2	2.1	2.9	3.9	<5
	35-49	0.11	0.79	4.6	8	4.7	22.6	4.6	4	0.8	2	0.59	1	3.9	<5
	49-57.5		0.26		5		3.4		4		<1		0.38		<5
	57.8-87		0.18		5.7		0.82		2.8		0.9		0.49		4.4
HG 307C	top	0.006	0.016	2	2.3	0.71	0.24	2.7	0.6	0.4	0.4	1.3	1.36	0.9	0.9
	0-10.5	<0.005	0.012	5.1	4.3	7	13.5	2.4	0.9	0.9	0.7	3.9	2.86	1.2	1.2
	10.5-19.5	<0.005	<0.05	6.1	6	8.8	18.6	3.4	<2	1.4	1	5.5	3.6	1.6	<5
	19.5-92	<0.005	0.008	3	3.9	23	6.08	1.4	1	0.9	1.2	3.3	3.12	1.6	1.5

App2-Table 13a: Metal C

(Greater than Detection l

Location	Depth cm	Ni		S		Si		Zn	
		1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)
HG T1-150	top	0.004	0.017	3	2.3	10	9.7	0.046	0.021
	0-12.5	0.038	0.035	1.3	1.8	6.9	10.1	0.087	0.041
	12.5-41	0.024	0.032	0.45	2.7	5.9	7.6	0.11	0.082
	41-68.5	0.008	0.006	0.24	1.6	5.3	6.1	0.17	0.1
HG T1-290	top	0.053	0.045	21	2.9	30	21.2	0.098	0.044
	0-13	0.055	0.017	59	5.2	19	11.8	0.037	0.009
	13-63.5	0.004	0.002	63	30	18	17.6	0.05	0.016
HG T2-0	top	0.004	0.027	0.6	4.8	14	3.1	0.036	0.1
	0-13.5	0.003	0.32	45	92	13	29.9	0.072	0.18
	13.5-36	0.042	0.024	570	56	40	51.4	0.2	0.11
	36-57.5	0.011	0.016	550	600	46	45.1	0.16	0.034
	57.5-72.5	0.062	0.047	490	670	52	56.3	0.25	0.19
	72.5-78.5	0.089	0.064	430	610	54	54.5	0.39	0.18
HG T2-50	top	0.68	0.29	37	26	64	62.5	0.73	0.3
	0-11	0.3	0.23	79	41	59	59.6	0.58	0.29
	11-23	0.36	0.19	86	51	63	59	0.92	0.28
	23-48.5	0.38	0.29	70	47	55	53.8	1.5	0.76
	48.5-91	0.5	0.49	56	71	53	58.4	3.1	2.5
HG T2-75	top	0.25		0.85		13		0.06	
	0-12	0.36		4.7		12		0.054	
	12-26	1.7		110		26		0.1	
	26-57	0.43	0.34	150	190	27	19.9	0.12	0.035
	57-75		0.22		130		19.3		0.047
LSH T3-50	top	0.59	0.14	14	5.1	19	18.2	0.34	0.14
	0-17.5	0.17	0.07	41	6.1	14	18	0.052	<0.05
	17.5-95.5	0.026	0.023	0.53	0.79	5.3	9.8	0.078	0.038
LSH T3-75	top	0.35	0.35	1.5	1	10	10.2	0.038	0.03
	0-24	0.13	0.053	8.6	8.4	12	8.9	0.056	0.037
	24-35	0.31	0.12	13	9.2	14	13	0.075	<0.05
	35-49	0.5	0.35	15	17	22	20	0.64	0.19
	49-57.5		0.3		17		20		0.5
	57.8-87		0.45		9.5		19.3		1.3
HG 307C	top	0.01	0.012	0.37	0.3	10	9.3	0.032	0.024
	0-10.5	0.002	0.004	0.39	0.46	6.7	7	0.018	0.025
	10.5-19.5	0.002	<0.0.1	0.47	0.6	6.3	0.7	0.075	<0.05
	19.5-92	0.007	0.006	0.46	3	11	9.3	0.047	0.025

App2-Table 13b: Detection limits of Metal Concentration (mg/L) in Water over Depth after Flooding for 1065 and 1640 days

(Less than Detection Limit)

Location	Depth cm	Ag		Be		Cr		Mo		Pb		Ti		V	
		1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)	1065 days (7-Mar-02)	1640 days (15-Sep-2003)
HG-T1-150	top water	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	0.001	<0.001	<0.001
	0-12.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	12.5-41	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	41.68.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
HG-T1-290	top water	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	0-12	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001	0.005	<0.002	0.003	0.011	0.002	0.001	0.005
	12.62.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	0.002	0.006
HG-T2-0	top water	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	0-13.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
	13.5-36	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	36-57.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	0.036	<0.001	0.001	<0.001	0.014
	57.5-72.5	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.002	0.041	0.002	0.002	<0.001	0.018
	72.5-78.5	<0.001	<0.001	<0.001	<0.001	0.004	0.004	<0.001	<0.001	<0.002	0.034	<0.001	<0.001	0.01	0.019
HG-T2-50	top water	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	0-11	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	11-23	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.002	<0.02	<0.001	<0.01	<0.001	<0.01
	23-48.5	<0.001	<0.001	<0.001	0.001	<0.001	0.002	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	48.5-91	<0.001	<0.001	0.002	0.003	0.002	0.003	<0.001	<0.001	0.008	<0.002	<0.001	<0.001	<0.001	<0.001
HG-T2-75	top water	<0.001		<0.001		<0.001		<0.001		<0.002		<0.001		<0.001	
	0-12	<0.001		<0.001		<0.001		<0.001		<0.002		<0.001		<0.001	
	12-26	<0.001		<0.001		<0.001		<0.001		<0.002		<0.001		<0.001	
	26-57	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	0.004	<0.001	<0.001	<0.001	0.002
	57-75	NA	<0.001		<0.001		<0.001		<0.001		<0.002		<0.001		<0.001
LSH-T3-50	top water	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.002	<0.001	<0.001	<0.001	<0.001
	0-17.5	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	0.002	<0.01	0.004	<0.02	0.011	0.05	0.002	<0.01
	17.5-95.5	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.002	<0.002	<0.001	0.034	<0.001	0.002
LSH-T3-75	top water	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	0-24	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.005	<0.002	0.003	0.007	0.003	<0.001	0.003
	24-35	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.002	<0.02	<0.001	<0.01	<0.001	<0.01
	35-49	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.002	<0.02	<0.001	0.03	<0.001	<0.01
	49-57.5	NA	<0.01		<0.01		<0.01		<0.01		<0.02		<0.01		<0.01
	57.8-87	NA	<0.001		<0.001		<0.001		<0.001		<0.002		<0.001		0.001
HG 370C	top water	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	0-10.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
	10.5-19.5	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.002	<0.02	<0.001	<0.01	<0.001	<0.01
	19.5-92	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001

App2-Table 13b: Detection

(Less than Detection Limit)

Location	Depth cm	Zr 1065 days (7-Mar-02)	Zr 1640 days (15-Sep-2003)
HG-T1-150	top water	<0.001	<0.001
	0-12.5	<0.001	<0.001
	12.5-41	<0.001	<0.001
	41.68.5	<0.001	<0.001
HG-T1-290	top water	<0.001	<0.001
	0-12	0.011	0.003
	12.62.5	<0.001	<0.001
HG-T2-0	top water	<0.001	<0.001
	0-13.5	<0.001	<0.001
	13.5-36	0.001	<0.001
	36-57.5	0.002	0.001
	57.5-72.5	0.002	0.001
	72.5-78.5	0.002	<0.001
HG-T2-50	top water	<0.001	<0.001
	0-11	<0.001	<0.001
	11-23	<0.001	<0.01
	23-48.5	<0.001	<0.001
	48.5-91	<0.001	<0.001
HG-T2-75	top water	<0.001	
	0-12	<0.001	
	12-26	0.001	
	26-57	<0.001	<0.001
	57-75		<0.001
LSH-T3-50	top water	<0.001	<0.001
	0-17.5	0.009	<0.01
	17.5-95.5	<0.001	0.002
LSH-T3-75	top water	<0.001	<0.001
	0-24	0.008	0.002
	24-35	<0.001	<0.01
	35-49	<0.001	<0.01
	49-57.5		<0.01
	57.8-87		<0.001
HG 370C	top water	<0.001	<0.001
	0-10.5	<0.001	<0.001
	10.5-19.5	<0.001	<0.01
	19.5-92	<0.001	<0.001

App2-Table 14: Nutrients Released to Top Water from Strata over Time

Location	Apr-99	Nov-99	Nov-99	Jan-00	May-00	Jun-00	Aug-00	Nov-00	Oct-01	7-Mar-02	15-Sep-03
$[NH_3]$(mg/L)											
HG - T1 - 150	0.10	0.10	0.34	0.12	3.50	0.22	0.15	0.16	0.06	0.18	0.04
HG - T1 - 290	1.60	<0.05	8.20	14.00	15.00	14.00	16.00	22.00	28.00	17.00	0.11
HG - T2 - 0	1.20	dry	12.00	12.00	21.00	17.00	11.00	2.70	0.14	0.23	0.60
HG - T2 - 50	0.87	0.50	22.00	15.00	15.00	12.00	12.00	12.00	16.00	0.41	13.00
HG - T2 - 75	0.34	dry	0.64	8.80	8.90	17.00	15.00	18.00	2.90	15.00	0.05
LSH - T3 - 50	0.21	<0.05	0.27	0.14	0.46	0.14	0.29	0.22	0.13	0.99	0.06
LSH - T3 - 75	0.61	<0.05	18.00	16.00	21.00	21.00	21.00	6.20	5.00	1.70	2.00
HG-307C	0.70	0.31	0.58	1.30	1.20	0.38	1.70	2.90	5.80	0.25	0.04
$[NO_3$-N] (mg/L)											
HG - T1 - 150	<0.01	0.29	14	5.5	16.00	1.0	0.59	0.17	0.10	0.3	0.4
HG - T1 - 290	18	<0.01	49	14	0.19	0.23	0.21	0.13	0.23	2.9	2.5
HG - T2 - 0	<0.01	dry	1.8	<0.01	0.1	0.38	0.01	1.20	0.5	0.15	2.5
HG - T2 - 50	0.09	0.08	0.33	<0.01	0.04	0.03	<0.01	<0.01	<0.01	<0.05	<0.1
HG - T2 - 75	0.04	dry	147	42	0.39	0.08	0.12	0.12	1.7	1.6	0.6
LSH - T3 - 50	2.3	0.13	36	13	6.2	1.4	1.1	1.2	1.6	1.7	1.1
LSH - T3 - 75	12	<0.01	49	4.9	0.05	0.09	0.44	3.7	0.53	1.2	0.2
HG-307C	0.42	0.31	0.27	<0.01	0.03	0.2	<0.01	0.01	0.01	0.28	<0.1
TKN (mg/L)											
HG - T1 - 150	1.10	2.50	1.40	8.70	6.20	2.60	2.90	3.30	2.90	2.70	0.10
HG - T1 - 290	3.30	1.70	9.40	20.00	20.00	18.00	21.00	24.00	33.00	27.00	0.94
HG - T2 - 0	3.1	dry	12	16	33	22	16	6.5	3.6	13	0.73
HG - T2 - 50	2.0	1.0	20	19	21	15	15	16	19	20	14
HG - T2 - 75	1.9	dry	3.6	14	16	26	21	25	7.3	6.1	0.46
LSH - T3 - 50	2.0	0.93	1.9	7	3.8	2.1	3.5	3.1	4	3.2	0.39
LSH - T3 - 75	2.2	2.5	17	26	30	28	32	14	12	9.9	3.7
HG-307C	1.8	1.0	1.8	10	4.6	3.7	4.2	6.3	8.8	2.6	0.18
[P] (mg/L)											
HG - T1 - 150	<0.01	<0.1	<0.1	0.4	0.05	<0.01	<0.01	0.02	<0.01	<0.01	0.02
HG - T1 - 290	<0.01	0.20	<0.1	0.4	3.2	<0.01	<0.01	0.03	0.01	0.01	0.03
HG - T2 - 0	<0.01	dry	<0.1	0.66	0.03	0.14	0.13	0.04	<0.01	<0.01	0.01
HG - T2 - 50	<0.01	<0.1	<0.1	0.3	0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.02
HG - T2 - 75	<0.01	dry	<0.5	0.36	0.11	0.09	0.04	0.05	0.02	0.01	0.09
LSH - T3 - 50	<0.01	1.5	<0.1	0.34	<0.05	<0.01	<0.01	0.03	<0.01	<0.01	0.01
LSH - T3 - 75	<0.01	<0.1	1.1	1.5	0.44	0.3	0.13	0.05	0.04	0.02	0.04
HG-307C	<0.01	<0.1	0.2	0.47	9.3	0.01	<0.01	0.01	<0.01	<0.01	0.01

Total P   Dissolved P   Ortho-PO_4

App2-Table 15: Nutrient Concentrations over Depth after Flooding for 1065 and 1640 days

Location	Depth cm	NH3 -N			NO2+NO3-N			TKN			P		
		in water, mg/L		in soil, mg/kg	in water, mg/L		in soil, mg/kg	in water, mg/L		in soil, mg/kg	in water, mg/L		in soil, mg/kg
		1065 days (7-Mar-02)	1640 days (18-Sep-2003)	1643 days (18-Sep-2003)	1065 days (7-Mar-02)	1640 days (18-Sep-2003)	1643 days (18-Sep-2003)	1065 days (7-Mar-02)	1640 days (18-Sep-2003)	1643 days (18-Sep-2003)	1065 days (7-Mar-02)	1640 days (18-Sep-2003)	1643 days (18-Sep-2003)
HG T1-150	0-12.5	0.21	0.1	7.4	0.63	2	2	3.3	1.7	90	<0.01	0.01	160
	12.5-41	0.10	0.04	<1	1.1	0.6	1	2.4	0.11	32	<0.01	<0.01	40
	41-68.5	0.16	0.02	<1	1.1	0.7	1	2.4	0.37	28	<0.01	0.01	40
HG T1-290	0-12	20	10	122	<0.5	0.6	7	46	21	12090	0.29	0.21	1250
	12-62.5	7.2	11.0	2	<0.1	<0.1	<1	13	13	60	0.13	0.24	80
HG T2-0	0-13.5	8.1	13	<1	3.9	1	2	13	15	360	0.02	0.05	130
	13.5-36	27	11	3	0.15	0.2	1	36	14	150	0.05	0.02	300
	36-57.5	28	27	6	2.6	<0.1	<1	39	34	160	0.08	0.14	
	57.5-72.5	26	30	13	2.1	0.2	2	36	39	500	0.06	0.14	200
	72.5-78.5	NA	33	4	NA	<0.1	1	NA	42	44	0.04	0.16	150
HG T2-50	0-11	11	11	94	<0.05	<0.1	4	16	12	3446	0.02	0.02	970
	11-23	10	10	<1	<0.1	<0.1	<1	14	11	27	0.02	<0.1	50
	23-48.5	8.3	9.1	<1	<0.1	<0.1	1	11	11	33	<0.01	0.02	40
	48.5-91	5.8	7.9	<1	0.22	<0.1	<1	10	10	32	0.01	0.02	50
HG T2-75	0-12	16	12	44	<0.1	<0.1	6	32	17	2570	0.09	0.21	2090
	12-26	19.0	23.0	37	<0.1	0.1	<1	32	36	1400	0.13	0.24	930
	26-57	7.1	14.0	150	0.44	0.2	2	10	20	200	0.02	0.11	910
	57-75	NA	3.7	5	NA	0.2	4	NA	4.2	120	NA	0.02	80
LSH T3-50	0-17.5	3.1	2.2	9	0.29	0.1	2	26	16	2060	0.32	0.4	380
	17.5-95.5	0.27	0.44	<1	0.1	<0.1	2	5.1	3.1	20	<0.01	0.07	30
LSH T3-75	0-24	20	24	83	<0.1	0.1	2	54	53	4600	0.38	0.36	1000
	24-35	18	20	21	<0.1	<0.1	4	27	32	420	0.03	0.2	140
	35-49	6.2	13.0	5	0.25	<0.1	<1	3.4	21	42	<0.01	0.1	30
	49-57.5	NA	8.0	9	NA	<0.1	1	NA	12	130	NA	<0.1	100
	57.8-87	NA	0.9	<1	NA	0.8	<1	NA	1.4	30	NA	0.01	50
HG 307C	0-10.5	3.4	2.0	2	<0.1	<0.1	2	9.2	5	690	0.01	0.03	410
	10.5-19.5	4.2	2.7	<1	<0.1	<0.1	2	8.4	4.4	270	0.01	<0.1	30
	19.5-92	1.6	2.2	<1	0.16	<0.1	<1	4.8	3.4	32	0.01	0.02	80

App2-Table 16: Correlation between Nutrients and Chemistry in Top Water

NH_3-N with (n-2=6)										
Location	pH		Acidity, mg/l		Conductivity, uS/cm		Em, mv		Ni, mg/l	
HG - T1 - 150	0.5668		-0.3782		0.3977		-0.2068		0.7961	**
HG - T1 - 290	-0.0060		-0.0602	*	0.2022		-0.1183		-0.1937	
HG - T2 - 0	0.3233		-0.2624		0.2149		0.0566		0.7523	**
HG - T2 - 50	-0.6541	*	0.7219	*	0.6773	*	0.0825		0.8090	**
HG - T2 - 75	0.6537	*	0.2798		-0.1761		-0.6196	*	-0.0231	
LSH - T3 - 50	0.8758	**	0.0486		0.1406		-0.0771		-0.2073	
LSH - T3 - 75	0.0441		-0.2059		0.7002	*	0.0222		0.0099	
HG-307C	0.3674		-0.0073		0.0641		-0.4574		0.3536	
NO_2+NO_3-N with (n-2=6)										
Location	pH		Acidity, mg/l		Conductivity, uS/cm		Em, mv		Ni, mg/l	
HG - T1 - 150	0.0723		0.1056		0.8620	**	-0.0880		0.8696	**
HG - T1 - 290	-0.3259		0.8063	**	0.6513	*	0.1161		0.8493	**
HG - T2 - 0	-0.7310	*	0.7064	*	-0.0514		0.4447		-0.4467	
HG - T2 - 50	-0.0649		0.2380		0.6267	*	0.6529	*	0.3869	
HG - T2 - 75	-0.7848	**	-0.0958		0.9244	**	0.2829		0.6952	*
LSH - T3 - 50	-0.3111		0.8093	**	0.8618	**	0.4279		0.9143	**
LSH - T3 - 75	-0.6547	*	-0.2952		0.5111		0.6861	*	-0.2036	
HG-307C	-0.8126	**	-0.0413		0.2467		0.8093	**	-0.4168	
TKN with (n-2=6)										
Location	pH		Acidity, mg/l		Conductivity, uS/cm		Em, mv		Ni, mg/l	
HG - T1 - 150	0.1076		-0.4539		0.3505		-0.5243		0.3528	
HG - T1 - 290	-0.3987		0.0721		0.2667		0.1707		-0.0562	
HG - T2 - 0	0.5153		-0.3715		0.0572		-0.1352		0.7355	**
HG - T2 - 50	-0.8633	**	0.9495	**	0.6543	*	0.0622		0.7967	**
HG - T2 - 75	0.5297		-0.2544		-0.0225		-0.5021		0.1774	
LSH - T3 - 50	-0.2732		0.4582		0.4035		-0.1901		0.1553	
LSH - T3 - 75	0.3264		-0.0669		0.6019	*	-0.2345		-0.0764	
HG-307C	0.5279		0.6120	*	0.3222		-0.6245	*	0.8039	*
Ni with (n-2=6)										
Location	pH		Acidity, mg/l		Conductivity, uS/cm		Em, mv			
HG - T1 - 150	0.4425		-0.0472		0.7878	**	0.1094			
HG - T1 - 290	-0.5125		0.9291	**	0.7534	**	0.2299			
HG - T2 - 0	-0.0852		0.1026		0.4885		0.3137			
HG - T2 - 50	-0.7515	**	0.8188	**	0.6630	*	0.1163			
HG - T2 - 75	-0.5995		-0.3203		0.8036	**	0.0893			
LSH - T3 - 50	-0.3928		0.7019	*	0.7420	**	0.3175			
LSH - T3 - 75	-0.1780		-0.1319		-0.1274		0.1085			
HG-307C	0.3266		0.8665	**	0.6294	*	-0.4280			

* Significant at 0.05 level (r=0.602, n-2=9) ** Significant at 0.01 level (r=0.735, n-2=9)

Note: Most of the concentrations of P are lower than detection limits.

App2-Table 17: Correlations between [Ni]-ICP (SRC) and [Ni] -Colometric (Boojum)

Location	7-Apr-99		24-Nov-99		26-Nov-99		20-Jan-00		11-May-00		22-Jun-00		9-Aug-00		29-Nov-00		5-Oct-01		7-Mar-02		10-Sep-02	
	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm	Ni-SRC	Ni-Bjm
HG - T1 - 150	0.005	0.09	ns	0.075	0.210	0.57	0.10	0.23	0.03	0.91	0.015	0.51	0.009	0.11	0.008	0.08	0.001	0.063	0.004	0.0266	0.0492	0.057
HG - T1 - 290	0.69	0.91	ns	0.071	1.30	1.95	ns	1.33	0.71	0.82	0.52	0.63	0.46	0.54	0.33	0.42	0.11	0.447	0.053	0.0716	0.0902	0.109
HG - T2 - 0	0.02	0.37	ns	dry	0.140	0.57	0.056	0.28	0.012	0.70	0.006	0.36	0.011	0.44	0.008	0.15	0.006	0.256	0.004	0.0766	0.1492	0.130
HG - T2 - 50	0.058	0.11	0.021	0.075	ns	1.60	1.50	1.71	1.3	1.46	0.94	1.09	0.88	0.97	0.97	1.1	0.94	1.11	0.68	0.292	-0.096	0.382
HG - T2 - 75	0.23	0.59	ns	dry	22	4.50	ns	5.23	0.46	0.73	1.4	3.00	0.86	1.93	0.46	1.13	0.38	1.50	0.25	0.348	0.446	0.677
LSH - T3 - 50	1.2	1.41	0.094	2.23	3.90	5.8	2.80	3.37	1.7	1.80	0.71	0.75	0.64	0.85	0.89	1.08	1.0	1.31	0.59	0.269	-0.052	0.232
LSH - T3 - 75	4.4	4.9	1.00	3.40	3.20	0.72	0.46	1.14	1.7	2.57	1.5	2.69	1.2	3.0	0.64	1.27	0.84	3.42	0.35	0.283	0.216	0.576
HG-307C	0.38	0.55	0.032	0.087	0.130	0.35	0.29	2.70	0.24	0.72	0.17	1.34	0.11	1.24	0.052	0.23	0.037	1.51	0.01	0.223	0.436	0.161
Correlation between Ni-SRC & Ni-Bjm	**0.9975****		**0.8282***		**0.6031**		**0.7429***		**0.8860****		**0.8494***		**0.7878***		**0.8884****		**0.5825**		**0.6993**		**0.3660**	

* Significant at 5 % (r=0.707, n-2=6) level. ** Significant at 1 % (r=0.884, n-2=6)

App2-Table 18a: Raw Data 15-Sep-03

15-Sep-03		Assayer		NH_3-N	$NO_2 + NO_3$	TKN	Al	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	P	K	Si	Ag
Water profile		FA	WS																		
HG-T2-75	top water	10541	10577	0.05	0.6	0.46	0.015	7.3	<0.001	0.031	0.002	0.062	<0.002	1.4	7.8	<0.001	0.44	0.09	1.6	23.3	<0.001
	0-12	10542	10578	12	<0.1	17	<0.005	11	<0.001	0.034	0.006	143	0.049	2.6	15.5	<0.001	0.18	0.08	2.1	14.1	<0.001
	12-26	10543	10579	23.0	0.1	36	<0.005	17	<0.001	0.1	0.003	116	0.002	5.4	13.9	<0.001	0.86	0.1	2.3	18.4	<0.001
	26-57	10544	10580	14.0	0.2	20	<0.005	42	<0.001	0.27	<0.001	222	0.004	12	37.6	<0.001	0.34	0.11	2.2	19.9	<0.001
	57-75	10545	10581	3.7	0.2	4.2	<0.005	47	<0.001	0.37	<0.002	56	<0.002	12	63.3	<0.001	0.22	0.02	2.7	19.3	<0.001
LSH-T3-50	top water	10546	10582	0.06	1.1	0.39	0.3	2.3	<0.001	0.039	0.006	0.13	<0.002	0.7	1.04	<0.001	0.14	0.01	1.1	18.2	<0.001
	0-17.5	10547	10583	2.2	0.1	16	1.4	4	<0.01	<0.01	0.03	37.3	<0.02	<1	0.87	<0.01	0.07	0.4	3	18	<0.01
	17.5-95.5	10548	10584	0.44	<0.1	3.1	1	2.4	0.001	0.003	0.006	31.4	<0.002	0.5	0.41	<0.001	0.023	0.07	0.7	9.8	<0.001
HG-T2-0	top water	10549	10585	0.6	2.6	0.78	0.027	5.6	<0.001	0.002	0.004	0.088	<0.002	1.5	1.83	<0.001	0.027	0.01	0.9	3.1	<0.001
	0-13.5	10550	10586	13	1	15	0.61	48	<0.001	0.056	0.01	0.11	<0.001	5.7	44.2	<0.001	0.32	0.05	5.6	29.9	<0.001
	13.5-36	10551	10587	11	0.2	14	0.24	3.5	<0.001	<0.001	0.037	27.4	<0.002	1.5	0.36	<0.001	0.024	0.02	2.1	51.4	<0.001
	36-57.5	10552	10588	27	<0.1	34	0.019	3.7	<0.001	<0.001	<0.001	948	0.036	4.3	0.46	<0.001	0.016	0.14	4.3	45.1	<0.001
	57.5-72.5	10553	10589	30	0.2	39	2.8	5.2	<0.001	0.006	<0.001	1020	0.041	6.5	0.6	<0.001	0.047	0.14	5.8	56.3	<0.001
	72.5-78.5	10554	10590	33	<0.1	42	7.7	6	0.004	0.011	<0.001	869	0.034	7.4	0.56	<0.001	0.064	0.16	5.6	54.5	<0.001
HG-T1-290	top water	10555	10591	0	2.5	0.94	0.33	1.7	<0.001	0.006	0.011	0.28	<0.002	0.6	0.19	<0.001	0.045	0.03	0.9	21.2	<0.001
	0-12	10556	10592	10	0.6	21	0.029	2.6	0.001	<0.001	0.0008	125	0.003	0.8	0.21	0.005	0.017	0.21	1.6	11.8	<0.001
	12.62.5	10557	10593	11.0	<0.1	13	0.035	7.3	<0.001	<0.001	0.006	43	<0.002	2.9	0.34	<0.001	0.002	0.24	8	17.6	<0.001
HG-T2-50	top water	10558	10594	13	<0.1	14	0.18	4.1	<0.001	0.069	0.013	0.45	<0.002	1.3	0.58	<0.001	0.29	0.02	2.1	62.5	<0.001
	0-11	10559	10595	11	<0.1	12	1.6	4.7	0.001	0.052	0.028	17.6	<0.002	1.5	0.051	<0.001	0.23	0.02	2.4	59.6	<0.001
	11-23	10560	10596	10	<0.1	11	2.4	10	<0.01	0.05	0.03	35.9	<0.02	3	0.52	<0.01	0.19	<0.1	2	59	<0.01
	23-48.5	10561	10597	9.1	<0.1	11	8	15	0.002	0.076	0.026	0.19	<0.002	4.3	0.76	<0.001	0.29	0.02	2.7	53.8	<0.001
	48.5-91	10562	10598	7.9	<0.1	10	15.4	16	0.003	0.12	0.03	0.16	<0.002	3.9	1.19	<0.001	0.49	0.02	2.7	58.4	<0.001
HG-T1-150	top water	10563	10599	0.04	0.4	0.1	0.31	2.9	<0.001	<0.001	0.009	0.22	<0.002	0.7	0.086	<0.001	0.017	0.02	0.7	9.7	<0.001
	0-12.5	10564	10600	0.1	2	1.7	0.03	2.8	<0.001	<0.001	0.004	0.19	<0.002	0.7	3.75	<0.001	0.035	0.01	1.2	10.1	<0.001
	12.5-41	10565	10601	0.04	0.6	0.11	0.029	5.5	<0.001	<0.001	0.003	0.013	<0.002	1.4	0.18	<0.001	0.032	<0.01	1.1	7.6	<0.001
	41-68.5	10566	10602	0.02	0.7	0.37	0.033	6.2	<0.001	<0.001	0.006	0.03	<0.002	1.8	0.053	<0.001	0.006	0.01	0.8	6.1	<0.001
LSH-T3-75	top water	10567	10603	2.0	0.2	3.7	0.017	10	<0.001	0.043	0.016	10.1	<0.002	2	6.19	<0.001	0.35	0.04	4.8	10.2	<0.001
	0-24	10568	10604	24	0.1	53	0.05	11	<0.001	<0.001	0.02	105	0.003	2.7	4.34	0.005	0.053	0.36	6.3	8.9	<0.001
	24-35	10569	10605	20	<0.1	32	0.08	11	<0.01	<0.01	0.02	106	<0.02	2	2.9	<0.01	0.12	0.2	4	13	<0.01
	35-49	10570	10606	13.0	<0.1	21	0.79	8	<0.01	0.03	0.05	22.6	<0.02	2	1	<0.01	0.35	0.1	4	20	<0.01
	49-57.5	10571	10607	8.0	<0.1	12	0.26	5	<0.01	0.03	<0.01	3.4	<0.02	<1	0.38	<0.01	0.3	<0.1	4	20	<0.01
	57.8-87	10572	10608	0.9	0.8	1.4	0.18	5.7	<0.001	0.046	0.008	0.82	<0.002	0.9	0.49	<0.001	0.45	0.01	2.8	19.3	<0.001
HG 370C	top water	10573	10609	0.04	<0.1	0.18	0.016	2.3	<0.001	<0.001	0.008	0.24	<0.002	0.4	1.36	<0.001	0.012	0.01	0.6	9.3	<0.001
	0-10.5	10574	10610	2.0	<0.1	5	0.012	4.3	<0.001	<0.001	0.006	13.5	<0.002	0.7	2.86	<0.001	0.004	0.03	0.9	7	<0.001
	10.5-19.5	10575	10611	2.7	<0.1	4.4	<0.05	6	<0.01	<0.01	<0.01	18.6	<0.02	1	3.6	<0.01	<0.0.1	<0.1	<2	0.7	<0.01
	19.5-92	10576	10612	2.2	<0.1	3.4	0.008	3.9	<0.001	0.009	0.003	6.08	<0.002	1.2	3.12	<0.001	0.006	0.02	1	9.3	<0.001

Table 18a: [Solid] of Stata Final Analysis

	16-Sep-03		NH_3-N	NO_2 + NO_3	TKN	Al	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	P	K	Si	Ag
HG-T1-150	0.2-5	10613	7.4	<1	36	340	54	0.7	<0.5	<0.5	9110	<1	44	93	<0.5	4	60	60		<0.5
	2.5-4.0	10614	<1	2	32	2300	390	610	1.6	3.3	7130	1	270	160	2.7	15	60	640		<0.5
	4-12.5	10615	<1	<1	22	1100	220	500	1.6	2.9	5620	1	180	55	2.2	14	40	340		<0.5
	12.5-41	10616	<1	1	32	1400	280	680	1.6	4.4	6340	1	140	52	3.2	15	40	470		<0.5
	41-68.5	10617	<1	1	28	1300	210	720	1.7	3.2	6700	1	130	42	3.1	15	40	410		<0.5
HG-T1-290	0-8	10618	100	4	11700	15800	420	23	3.8	8.9	118000	7	920	210	3.6	53	1100	2000		<0.5
	8-12	10619	22	3	390	8600	250	5.1	0.7	1.2	10200	3	950	21	<0.5	7	150	1900		<.5
	12-27	10620	<1	<1	31	1200	200	770	1.5	3.6	6740	2	140	37	3.3	15	40	360		<0.5
	27-62.5	10621	2	<1	29	1200	220	630	1.5	3.1	5730	1	150	32	2.6	14	40	420		<0.5
HG-T2-0	0-8	10622	<1	2	360	730	110	1	<0.5	<0.5	3660	1	79	40	<0.5	3.5	70	100		<0.5
	8-11.5	10623	3	1	150	440	47	0.7	<0.5	<0.5	2820	<1	35	15	<0.5	1.3	30	60		<0.5
	11.5-50	10624	6	<1	160	360	35	<0.5	<0.5	<0.5	30500	<1	42	28	2.4	2.8	300	<40		<0.5
	50-72.5	10625	13	2	500	1100	120	1.5	<0.5	0.5	12700	<1	130	12	0.8	2	200	260		<0.5
	72.5-78.5	10626	4	1	44	400	32	<0.5	<0.5	<0.5	12000	<1	37	4.8	1	0.7	150	70		<0.5
HG-T2-50	0-8	10627	63	1	2400	5300	260	2.8	7.5	4.1	123000	5	500	130	0.8	49	610	1100		<0.5
	8-9	10628	31	3	1000	2300	140	3.3	3.2	2.7	49500	2	300	57	<0.5	25	310	380		<0.5
	9-11	10629	<1	<1	46	1300	190	680	1.5	2.9	6150	1	140	33	2.8	14	50	420		<0.5
	11-21	10630	<1	<1	27	2200	440	890	2	4.1	8140	1	190	45	3.8	18	50	680		<0.5
	21-48.5	10631	<1	1	33	1100	210	310	1.7	3.7	7580	1	130	36	2.6	16	40	340		<0.5
	48.5-91	10632	<1	<1	32	2100	270	630	1.5	2.7	6030	1	160	32	2.6	13	50	650		<0.5
HG-T2-75	0-7.5	10633	2	1	630	1800	160	2.6	5	0.8	36900	2	120	250	0.6	81	360	160		<0.5
	7.5-10.5	10634	29	2	1200	3500	230	5	9.7	1.8	56400	3	260	330	0.8	120	530	380		<0.5
	10.5-12	10635	13	3	740	3800	180	5.9	8.8	<0.5	151000	7	85	610	1.9	120	1200	110		<0.5
	12-26	10636	37	<1	1400	3100	180	5.3	8.3	1.9	77200	4	140	350	1.3	110	930	200		<0.5
	26-57	10637	150	2	200	3800	730	6.5	15	2.1	186000	7	440	540	<0.5	130	910	550		<0.5
	57-75	10638	5	4	120	800	250	1.1	2.7	<0.5	7640	<1	170	130	<0.5	4	80	120		<0.5
LSH-T3-50	0-7	10639	5	1	1700	4300	330	7	4.3	6.6	18200	6	590	89	1.3	38	260	700		<0.5
	7-17.5	10640	4	1	360	4800	380	4.4	1.5	1.9	3610	4	680	28	<.5	9.6	120	1200		<0.5
	17.5-95.5	10641	<1	2	20	250	100	<0.5	<0.5	<0.5	290	<1	57	2.3	<0.5	1.2	30	40		<0.5
LSH-T3-75	0-24	10642	83	2	4600	119000	790	15	17	10	75900	10	990	500	2.9	190	1000	1700		0.8
	24-35	10643	21	4	420	6800	570	4.8	1.9	2.7	6230	4	850	47	<0.5	18	140	1900		<0.5
	35-49	10644	5	<1	42	290	67	0.6	<0.5	<0.5	440	<1	72	4.3	<0.5	1.6	30	60		<0.5
	49-57.5	10645	9	1	130	3800	620	4.7	0.9	0.9	2730	2	540	31	<0.5	5.2	100	1000		<0.5
	57.5-87	10646	<1	<1	30	630	110	1.1	<0.5	1.8	630	1	160	5.2	<0.5	2	50	120		<0.5
HG 370C	0-10.5	10647	2	2	690	1600	170	6.7	1.5	<0.5	65700	3	86	230	1.1	48	410	160		<0.5
	10.5-19.5	10648	<1	2	270	260	89	<0.5	<0.5	<0.5	1100	<1	40	4.2	<0.5	0.7	30	40		<0.5
	19.5-92	10649	<1	<1	32	1800	620	360	1.8	2.7	6790	1	490	44	1.5	10	80	610		<0.5

App2-Table 18a: Raw

15-Sep-03		Na	Sr	S	Ti	V	Zn	Zr
Water profile								
HG-T2-75	top water	1.3	0.066	8.5	<0.001	<0.0010	0.16	<0.001
	0-12	1.7	0.11	1.7	<0.001	<0.001	0.043	<0.001
	12-26	2.2	0.13	75	<0.001	<0.001	0.05	<0.001
	26-57	2.4	0.16	190	<0.001	0.002	0.035	<0.001
	57-75	2.4	0.18	130	<0.001	<0.001	0.047	<0.001
LSH-T3-50	top water	2.7	0.026	5.1	<0.001	<0.001	0.14	<0.001
	0-17.5	<5	0.05	6.1	0.05	<0.01	<0.05	<0.01
	17.5-95.5	1.5	0.03	0.79	0.034	0.002	0.038	0.002
HG-T2-0	top water	0.9	0.057	4.8	<0.001	<0.001	0.1	<0.001
	0-13.5	2.4	0.46	92	<0.001	<0.001	0.18	<0.001
	13.5-36	1.8	0.042	56	<0.001	<0.001	0.11	<0.001
	36-57.5	3.6	0.064	600	0.001	0.014	0.034	0.001
	57.5-72.5	4.8	0.083	670	0.002	0.018	0.19	0.001
	72.5-78.5	5.4	0.085	610	<0.001	0.019	0.18	<0.001
HG-T1-290	top water	1.9	0.02	2.9	<0.001	<0.001	0.044	<0.001
	0-12	2.2	0.032	5.2	0.002	0.005	0.009	0.003
	12.62.5	2.5	0.061	30	<0.001	0.006	0.016	<0.001
HG-T2-50	top water	2.6	0.045	26	<0.001	<0.001	0.3	<0.001
	0-11	2.4	0.048	41	<0.001	<0.001	0.29	<0.001
	11-23	<5	0.07	51	<0.01	<0.01	0.28	<0.01
	23-48.5	5.9	0.11	47	<0.001	<0.001	0.76	<0.001
	48.5-91	5.8	0.12	71	<0.001	<0.001	2.5	<0.001
HG-T1-150	top water	1.4	0.028	2.3	0.001	<0.001	0.021	<0.001
	0-12.5	1.4	0.031	1.8	<0.001	<0.001	0.041	<0.001
	12.5-41	2.2	0.055	2.7	<0.001	<0.001	0.082	<0.001
	41-68.5	2.7	0.048	1.6	<0.001	<0.001	0.1	<0.001
LSH-T3-75	top water	2.2	0.097	1	<0.001	<0.001	0.03	<0.001
	0-24	3.6	0.13	8.4	0.003	0.003	0.037	0.002
	24-35	<5	0.13	9.2	<0.01	<0.01	<0.05	<0.01
	35-49	<5	0.08	17	0.03	<0.01	0.19	<0.01
	49-57.5	<5	0.05	17	<0.01	<0.01	0.5	<0.01
	57.8-87	4.4	0.071	9.5	<0.001	0.001	1.3	<0.001
HG 370C	top water	0.9	0.022	0.3	<0.001	<0.001	0.024	<0.001
	0-10.5	1.2	0.045	0.46	<0.001	<0.001	0.025	<0.001
	10.5-19.5	<5	0.05	0.6	<0.01	<0.01	<0.05	<0.01
	19.5-92	1.5	0.032	3	<0.001	<0.001	0.025	<0.001

Table 18a: [Solid] of St

	16-Sep-03	Na	Sr	S	Ti	V	Zn	Zr
HG-T1-150	0.2-5	<50	11	7	11	1.6	<0.5	0.6
	2.5-4.0	290	36	15	78	6.9	2.3	7.5
	4-12.5	200	28	28	25	3.8	7.4	2.3
	12.5-41	290	30	15	64	6.1	15	8.7
	41-68.5	210	31	12	46	6.1	2.6	8.1
HG-T1-290	0-8	110	67	2400	260	36	70	12
	8-12	80	96	100	120	9.6	4.4	5
	12-27	140	35	44	32	6.2	7.7	3.2
	27-62.5	270	28	19	27	5	6.2	3.1
HG-T2-0	0-8	<50	24	95	31	1.6	6.2	2.1
	8-11.5	<50	12	67	16	0.7	11	1
	11.5-50	<50	11	110	10	0.9	3.8	0.6
	50-72.5	<50	27	290	74	2	6.7	4.3
	72.5-78.5	<50	16	140	19	1.1	2.6	1
HG-T2-50	0-8	<50	51	1400	120	12	31	8
	8-9	<50	42	460	51	6.6	21	5.6
	9-11	220	46	36	32	5.3	9.7	3.1
	11-21	510	34	27	55	7.5	2.5	5.7
	21-48.5	200	27	28	21	4.4	1.2	2.1
	48.5-91	320	37	24	49	5.5	1.7	7.9
HG-T2-75	0-7.5	<50	27	140	38	4.7	46	2.8
	7.5-10.5	<50	35	290	72	9	72	4.5
	10.5-12	<50	20	200	28	13	150	3.8
	12-26	<50	24	330	57	9.7	61	3.8
	26-57	<50	35	710	60	9.5	47	6.7
	57-75	<50	32	96	37	2.2	9.3	2.4
LSH-T3-50	0-7	110	56	620	95	9.5	64	7.1
	7-17.5	140	72	120	170	6.5	6.7	8.8
	17.5-95.5	<50	22	9	8.8	<0.5	2.9	<0.5
LSH-T3-75	0-24	150	89	1100	320	25	150	3.2
	24-35	180	85	120	270	9.3	16	
	35-49	<0.5	19	14	15	0.5	13	
	49-57.5	240	55	39	200	5.8	7.3	
	57.5-87	-50	29	18	28	1.9	<0.5	
HG 370C	0-10.5	-50	22	130	34	4.5	30	
	10.5-19.5	-50	12	<5	8.1	<0.5	8.2	
	19.5-92	320	35	12	200	7.1	1.3	4.4

App2-Table 18b: Raw Data before 15-sep-03 (incomplete)

		NH3	NO3	TKN	Al	Ca	Fe	K	Mg	Mn	Na	Ni	P	S	Si	Zn
7-Apr-99	HG-T1-150	0.1	-0.01	1.1	-0.005	0.7	0.013	0.8	0.1	0.044	0.7	0.005	-0.01	0.31	2.7	0.034
24-Nov-99	HG-T1-150	0.1	0.29	2.5									-0.1			
26-Nov-99	HG-T1-150	0.34	14	1.4									-0.1			
20-Jan-00	HG-T1-150	0.12	5.5	8.7									0.4			
11-May-00	HG - T1 - 150				0.024	7.10	0.49	5.4	2.1	20	2.1	0.03	0.03	0.96	6.8	0.054
22-Jun-00	HG - T1 - 150	0.22	1	2.6	0.017	3.4	0.1	3.2	1	11	1	0.015	<0.01	3.6	7.3	0.01
9-Aug-00	HG - T1 - 150	0.15	0.59	2.9	0.011	1.7	0.019	2.5	0.5	0.95	1.2	0.009	-0.01	1.1	8.5	0.04
29-Nov-00	HG - T1 - 150	0.16	0.17	3.3	0.043	1.3	0.026	1.7	0.4	0.26	1.3	0.008	0.02	1.1	9.3	0.048
5-Oct-01	HG - T1 - 150	0.06	0.1	2.9	0.011	1.8	0.006	2	0.5	0.025	0.8	0.001	-0.01	1.9	11	0.008
7-Apr-99	HG-T1-290	1.6	18	3.3	3.9	9	0.25	2.5	1.6	1.4	3.7	0.69	-0.01	9.1	28	0.88
24-Nov-99	HG-T1-290	-0.05	-0.01	1.7									0.2			
26-Nov-99	HG-T1-290	8.2	49	9.4									-0.1			
20-Jan-00	HG-T1-290	14	14	20									0.4			
11-May-00	HG - T1 - 290				6.7	5.9	0.81	3.2	1.4	0.9	5.1	0.71	0.02	40	47	0.82
22-Jun-00	HG - T1 - 290	14	0.23	18	6	4.1	2.8	2.3	1	0.7	3.6	0.52	<0.01	37	40	0.67
9-Aug-00	HG - T1 - 290	16	0.21	21	5.3	3.8	1.47	2.5	1	0.65	4	0.46	-0.01	39	42	0.52
29-Nov-00	HG - T1 - 290	22	0.13	24	4.2	3.8	1.3	2.4	1.2	0.062	4	0.33	0.03	43	43	0.42
5-Oct-01	HG - T1 - 290	28	0.23	33	0.73	1.8	0.52	2.2	0.8	0.4	2.8	0.11	0.01	39	40	0.14
7-Apr-99	LSH-T3-50	0.21	2.3	2	0.43	4.8	0.02	1.8	0.5	1.5	3.1	1.2	-0.01	8.3	18	0.75
24-Nov-99	LSH-T3-50	-0.05	0.13	0.93									1.5			
26-Nov-99	LSH-T3-50	0.27	36	1.9									-0.1			
20-Jan-00	LSH-T3-50	0.14	13	6.5									0.34			
11-May-00	LSH - T3 - 50				2.20	6	0.55	4.2	0.9	5.8	6.2	1.7	<0.05	11	29	0.86
22-Jun-00	LSH - T3 - 50	0.14	1.4	2.1	0.76	2.8	0.07	2.1	0.4	2.6	2.6	0.71	<0.01	7.4	17	0.46
9-Aug-00	LSH - T3 - 50	0.29	1.1	3.5	0.71	2.7	0.18	2.3	0.4	2.2	2.6	0.64	<0.01	7.5	16	0.38
29-Nov-00	LSH - T3 - 50	0.22	1.2	3.1	1.8	3.3	0.15	2.1	0.5	2.9	3	0.89	0.03	11	20	0.57
5-Oct-01	LSH - T3 - 50	0.13	1.6	4	4.6	4.2	0.13	2.5	0.9	4.1	3.3	1	-0.01	20	25	0.62
		NH3	NO3	TKN	Al	Ca	Fe	K	Mg	Mn	Na	Ni	P	S	Si	Zn
7-Apr-99	LSH-T3-75	0.61	12	2.2	1.4	15	0.025	2.6	2.3	4.1	3.4	4.4	-0.01	17	33	8.5
24-Nov-99	LSH-T3-75	-0.05	-0.01	2.5									-0.1			
26-Nov-99	LSH-T3-75	18	49	17									1.1			
20-Jan-00	LSH-T3-75	16	4.9	26									1.5			
11-May-00	LSH - T3 - 75				0.26	32.0	54	22	6.4	17	4.7	1.7	0.44	3.5	29	0.093
22-Jun-00	LSH - T3 - 75	21	0.09	28	0.12	27	51	13	4.8	16	2.8	1.5	0.3	2.6	19	0.021
9-Aug-00	LSH - T3 - 75	21	0.44	32	0.06	24	49	11	3.7	14	2.8	1.2	0.13	2.1	15	0.043
29-Nov-00	LSH - T3 - 75	6.2	3.7	14	0.027	13	13	8.7	2.4	8.8	2.4	0.64	0.05	1.8	11	0.032
5-Oct-01	LSH - T3 - 75	5	0.53	12	0.008	17	14	8.8	3	12	2.7	0.84	0.04	1.9	11	0.035
7-Apr-99	HG-T2-0	1.2	-0.01	3.1	1.5	2	28	1	0.4	0.056	1.9	0.02	0.01	45	20	0.89
26-Nov-99	HG-T2-0	12	1.8	12									-0.1			
20-Jan-00	HG-T2-0	12	-0.01	16									0.66			
11-May-00	HG - T2 - 0				0.05	24.0	20	13	6.1	15	6.1	0.012	0.05	2	19	0.038
22-Jun-00	HG - T2 - 0	17	0.38	22	0.026	14	23	7.1	3.5	9.9	2.8	0.006	0.14	0.94	16	0.023
9-Aug-00	HG - T2 - 0	11	0.01	16	0.039	10	28	5.6	2.3	7.2	3	0.011	0.13	2	16	0.055
29-Nov-00	HG - T2 - 0	2.7	1.2	6.5	0.034	3.4	1.1	3.8	0.9	2.2	2.2	0.008	0.04	0.79	14	0.024
5-Oct-01	HG - T2 - 0	0.14	0.5	3.6	0.006	3.6	0.028	4.1	1.3	2.8	2.1	0.006	-0.01	0.8	15	0.02
7-Apr-99	HG-T2-50	0.87	0.09	2	0.28	2	0.044	0.7	0.5	0.12	1.8	0.058	-0.01	7.2	13	0.98
24-Nov-99	HG-T2-50	0.5	0.08	1									-0.1			
26-Nov-99	HG-T2-50	22	0.33	20									-0.1			
20-Jan-00	HG-T2-50	15	-0.01	19									0.3			
11-May-00	HG - T2 - 50				0.93	7.1	0.69	2.6	1.5	1.7	4.6	1.3	0.01	41	71	0.89
22-Jun-00	HG - T2 - 50	12	0.03	15	0.69	5.2	0.59	2.2	1.1	1.3	2.9	0.94	<0.01	34	63	0.7
9-Aug-00	HG - T2 - 50	12	-0.01	15	0.62	5.1	0.49	2.6	1.1	1.2	3	0.88	-0.01	33	64	0.63
29-Nov-00	HG - T2 - 50	12	-0.001	16	0.79	6.1	0.45	3.1	1.5	1.4	3.6	0.97	0.02	36	65	0.74
5-Oct-01	HG - T2 - 50	16	-0.01	19	0.8	7	0.42	4.3	2.2	1.5	4.3	0.94	-0.01	44	72	0.88
7-Apr-99	HG-T2-75	0.34	0.04	1.9	0.095	27	0.031	2.1	6.5	11	2.4	0.23	-0.01	37	32	0.11
26-Nov-99	HG-T2-75	0.64	147	3.6									-0.5			
20-Jan-00	HG-T2-75	8.8	42	14									0.36			
11-May-00	HG - T2 - 75				0.096	7.1	0.57	8.3	1.7	6.6	4.5	0.46	0.11	18	36	0.35
22-Jun-00	HG - T2 - 75	17	0.08	26	0.029	30	6.5	7.1	6.4	29	2.9	1.4	0.09	3.9	16	0.29
9-Aug-00	HG - T2 - 75	15	0.12	21	0.007	26	31	7.5	4.6	24	2.7	0.86	0.04	1.7	13	0.027
29-Nov-00	HG - T2 - 75	18	0.12	25	0.021	19	7.7	6.8	3.4	16	2.5	0.46	0.05	3	9.9	0.099
5-Oct-01	HG - T2 - 75	2.9	1.7	7.3	-0.005	12	0.82	3.9	2.6	14	2.1	0.38	0.02	0.74	11	0.043
7-Apr-99	HG 307C	0.7	0.42	1.8	0.63	4.5	0.018	2.6	1	1.7	4.2	0.38	-0.01	14	41	3.7
24-Nov-99	HG 307C	0.31	0.02	1									-0.1			
26-Nov-99	HG 307C	0.58	0.27	1.8									2			
20-Jan-00	HG 307C	1.3	-0.01	10									0.47			
11-May-00	HG-307C				0.054	22	56	9.3	4	16	3.6	0.24	<0.05	0.82	18	<0.025
22-Jun-00	HG-307C	0.38	0.2	3.7	<0.005	13	25	5	2.2	10	1.3	0.17	0.01	0.32	13	0.009
9-Aug-00	HG-307C	1.7	-0.01	4.2	0.007	10	8	3.9	1.6	7.3	1.3	0.11	-0.01	0.71	11	0.013
29-Nov-00	HG-307C	2.9	0.01	6.3	0.01	4.9	3.9	3.1	0.9	3.8	1.2	0.052	0.01	0.22	12	0.014
5-Oct-01	HG-307C	5.8	0.01	8.8	-0.005	6.3	2.8	3.4	1.1	4.8	1	0.037	-0.01	0.16	11	0.008

App3-Table 1a : Comparison of water background pH for Top and Pore water in Key Lake Jars

Background Jars	water	pH		Eh, mv		Cond, uS/cm		Acidity, mg/L	
		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
		1187 days	1355 days	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days
DDH_2O + Sand #1	Top	5.69	4.93	174	386	194	177	26	79
	Pore	4.83	4.90	153	377	194	176	173	162
DDH_2O + Sand #2	Top	5.74	5.27	314	419	150	159	73	39
	Pore	5.05	4.78	281	431	191	176	147	134
DDH_2O + Sand #3	Top	4.10	3.78	501	500	112	99	16	20
	Pore	4.09	3.69	498	606	115	106	17	27
Key Lake Water + Sand #1	Top	4.62	6.00	462	329	177	147	124	33
	Pore	4.60	5.10	426	371	176	167	127	82
Key Lake Water + Sand #2	Top	5.34	5.09	365	335	172	168	75	110
	Pore	4.73	4.97	385	322	231	172	200	138
Key Lake Water + Sand #3	Top	6.54	6.94	322	344	84	78	7	6
	Pore	6.64	6.96	325	347	79	75	7	6
DDH_2O #1	Top	5.64	6.69	364	244	169	165	55	59
DDH_2O #2	Top	5.39	6.60	363	324	168	154	62	15
DDH_2O #3	Top	6.46	6.93	323	293	70	97	5	5
Key Lake Water	Top	5.12	5.20	385	406	154	161	63	14

Jars with potato waste addition.

App3-Table1b: Comparison of Top/Pore Water Background Chemistry 1187 and 1355 Days

	water	pH		Eh, mv		Cond, uS/cm		Acidity, mg/L	
Background Jars	date	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
	days	1187	1355	1187	1355	1187	1355	1187	1355
Jar without Potato Waste									
DDH_2O #3	Top	6.46	6.93	323	293	70	97	5	5
DDH_2O + Sand #3	Top	4.10	3.78	501	500	112	99	16	20
	Pore	4.09	3.69	498	606	115	106	17	27
Key Lake Water + Sand #3	Top	6.54	6.94	322	344	84	78	7	6
	Pore	6.64	6.96	325	347	79	75	7	6
Jar with Potato Waste									
DDH_2O + Sand #1	Top	5.69	4.93	174	386	194	177	26	79
	Pore	4.83	4.90	153	377	194	176	173	162
DDH_2O + Sand #2	Top	5.74	5.27	314	419	150	159	73	39
	Pore	5.05	4.78	281	431	191	176	147	134
Key Lake Water + Sand #1	Top	4.62	6.00	462	329	177	147	124	33
	Pore	4.60	5.10	426	371	176	167	127	82
Key Lake Water + Sand #2	Top	5.34	5.09	365	335	172	168	75	110
	Pore	4.73	4.97	385	322	231	172	200	138
Key Lake Water and Distill Water Alone									
DDH_2O #1	Top	5.64	6.69	364	244	169	165	55	59
DDH_2O #2	Top	5.39	6.60	363	324	168	154	62	15
Key Lake Water	Top	5.12	5.20	385	406	154	161	63	14

Jars with potato waste addition.

App3-Table2 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH		Eh, mv		Cond, us/cm		Acidity, mg/ L	
					29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
HG-T1-0	0-20	T	1.55	7600	5.61	5.88	41	264	217	355	37.6	747.7
		P			5.20	5.95	143	242	208	390	77.8	813.6
	20-32	T	66.51	2400	5.32	5.65	428	401	105.1	84.9	40.7	36.3
		P			5.40	5.60	437	417	98.3	85.8	39.2	38.8
	32-71	T	2.97	470	4.67	4.62	404	554	104.2	76.9	15.9	41.2
		P			4.83	4.58	346	546	100.1	85.7	15.8	16
	32-71 R	T			5.78	4.24	282	391	207	171	43.2	434.7
		P			5.03	4.26	258	389	183	180	53	445.2
HG-T1-50	0-4	T	0.88	23800	na	5.51	na	372	na	42.9	na	6.4
		P				5.64	na	401	na	41.5	na	6.4
	4-60	T	0.13	410	6.36	7.13	355	318	89.4	52.8	5.7	5.9
		P			6.47	7.02	350	326	86.7	52.7	6.0	6.4
HG-T1-80	0-5	T	1.10	5900	6.37	6.35	273	286	348	252	65.1	31.3
		P			6.08	6.51	181	177	654	285	505.7	116.4
	5-6	T	0.90	13000	7.01	6.46	393	281	310	268	17.1	18.9
		P			6.86	6.58	206	198	339	297	32.2	75.3
	5-9	T	0.70	16900	na	6.14	na	358	na	30	na	7.4
		P				6.08	na	375	na	30	na	7.4
	9-41	T	0.15	820	6.70	7.24	321	281	81.8	51.9	5.7	24.3
		P			6.68	7.02	328	309	81.9	51.6	5.8	6.2
HG-T1-100	0-4	T	0.53	3800	6.40	6.17	316	282	204	28.1	17.8	294.6
		P			5.36	6.06	353	249	226	363	51.8	590.5
	4-10	T	0.70	2000	5.06	5.55	416	383	80.4	55.6	7.7	8.7
		P			4.91	5.34	455	413	80.1	47.6	7.7	7.8
	10-18	T	0.27	590	5.80	4.99	312	335	193	172	30	215.5
		P			4.90	4.92	306	317	222	183	122.6	252.2
	18-42	T	0.09	910	5.41	5.85	409	397	76.1	42	6.6	6.4
		P			5.54	5.90	421	403	68.8	42	6.6	6.2
	42-60	T	0.10	620	6.02	6.12	404	400	72.6	45.3	6.6	6.2
		P			6.06	6.12	396	409	68.4	40.8	6.8	6.5
HG-T1-150	0-4	T	1.12	19100	5.33	5.89	430	412	83.3	49.9	7.6	7.6
		P			5.40	5.65	431	418	77.8	50.3	8.7	7.1
	4-6	T	0.75	23700	5.28	6.28	420	418	71.5	43.5	6.4	6.9
		P			5.40	6.09	418	425	72.2	43.7	6.4	6.7
	6-11	T	0.35	2100	6.12	6.90	391	304	72.5	43.2	6.7	6.1
		P			6.10	6.72	380	331	71.4	42.5	6.7	6.1
	11-35	T	0.11	740	6.61	6.96	281	342	81	47.2	6.5	6.1
		P			6.85	6.92	216	351	68.2	46.7	6.8	5.9
	11-35 R	T			4.89	4.98	258	395	218	190.6	106.7	137.6
		P			4.54	4.81	258	1811	234	193.1	169.8	164.3
	35-69	T	0.17	1400	6.59	6.77	270	403	89	68.7	6.30	6.4
		P			6.50	6.90	287	394	87.2	55.5	6.6	6.3
	35-69 R	T			5.02	5.63	-13	322	261	198	169.7	139.2
		P			4.80	5.50	50	318	356	205	348	142.9
HG-T1-200	0-1	T	1.48	24700	6.45	6.59	187	331	331	347	30.5	33.5
		P			6.18	6.52	251	236	425	368	58.5	208.9
	1-2	T	0.22	850	6.56	6.94	318	326	76.8	34	6	7.5
		P			6.61	6.89	334	328	76.1	34	5.7	6.3
	2-65	T	0.87	13000	5.60	6.14	439	357	69.7	27	7.6	6.8
		P			5.97	6.17	417	353	70.2	30	79	7

App3-Table2 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH		Eh, mv		Cond, us/cm		Acidity, mg/ L	
					29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
HG-T1-250	0-5	T	0.22	870	5.26	4.88	31	395	220	217	53.3	343
		P			4.74	4.97	1	369	302	245	280.2	430.2
	5-7	T	0.15	690	5.87	5.71	426	444	77.5	48.6	7.2	6.5
		P			5.81	5.60	433	451	77.6	34	7.2	7
	11-15	T	0.19	2200	5.86	5.89	444	393	72.5	43.5	9	6.8
		P			5.73	6.00	442	403	73.2	42.9	6.8	6.6
	15-26	T	0.15	410	na	6.26	na	365	na	43.6	na	6.2
		P				6.38	258	372	na	42	na	6.1
	26-38	T	0.23	2700	4.71	5.27	405	378	227	184	119.7	175.2
		P			4.54	5.06	392	370	280	201	260.1	231.9
HG-T1-290	0-6	T	36.5	112000	4.50	6.43	490	299	239	185.3	35.1	46.4
		P			4.47	6.20	460	301	265	219	64.6	145.2
	6-10	T	0.87	9500	4.68	5.08	480	392	345	244	49.4	236.2
		P			4.32	na	489	na	368	n	74.4	na
	10-60	T	0.32	1000	6.30	6.30	310	397	88.9	55.8	7.1	6.8
		P			6.42	6.72	269	407	86.1	56.2	7.1	6.9
	10-60 R	T			4.97	4.84	-54	385	243	190	87.5	239.3
		P			4.85	4.67	89	389	265	199	158.6	297.5
HG-T1-300	0-9	T	48.61	116000	6.38	6.18	235	392	472	161	130.2	42.8
		P			6.50	6.33	152	233	635	191	305	86.3
	0-9 R	T			6.51	6.76	258	332	690	197	288	24.1
		P			6.52	6.58	258	275	932	206	487.8	37.9
	9-36	T	35.70	134000	4.30	6.11	479	300	424	149.5	116.9	60.9
		P			4.35	6.19	443	239	473	211	185.2	164.5
	37-40	T	5.91	11800	4.36	3.981	511	503	506	313	84.6	128.2
		P			3.99	4.102	551	514	521	325	97.8	89.8
	40-60	T	0.13	650	na	5.83	na	422	na	46.8	na	6.9
		P				5.92	na	422	na	46	na	7
HG-T2-0	0-10	T	2.15	5000	6.14	5.97	242	290	521	315	281.7	445.1
		P			6.27	6.48	209	139	794	364	523.1	369
	10-27	T	0.89	23600	5.63	5.69	428	447	38	36.7	7.0	6.4
		P			5.71	5.66	428	453	36.6	36.2	7.1	6.8
	27-29	T	1.25	9000	4.28	4.44	439	462	83.9	74.9	9.8	9.4
		P			4.28	4.40	475	483	85.1	76.4	11.6	9.7
	29-50	T	3.13	78400	3.17	3.55	574	570	512	376	106.9	307.4
		P			3.16	3.55	580	531	524	399	123.9	370.1
	50-57	T	2.91	3400	2.90	2.92	715	710	624	464	122.9	129.5
		P			2.90	2.88	729	728	629	452	123.6	129.8
	57-65	T	0.67	1400	3.27	3.34	581	663	254	210	42.1	48.7
		P			3.24	3.36	589	677	244	216	44.3	43.6
	65-71	T	0.45	9500	3.00	3.03	634	651	464	343	82.1	86
		P			2.96	3.36	643	664	470	339	83.6	88.2

App3-Table2 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH		Eh, mv		Cond, us/cm		Acidity, mg/ L	
					29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
HG-T2-25	0-4	T	4.35	38900	7.36	6.73	262	300	172.2	64.4	10.7	8
		P			6.64	6.43	307	341	165.7	60.1	34.9	13
	4-10	T	0.28	3300	6.04	6.82	337	297	186	243	36.4	34.7
		P			4.92	6.60	416	181	320	275	196.3	69
	10-48	T	0.10	620	5.50	6.93	481	299	48.5	38	6.5	5.8
		P			5.68	6.68	457	339	44.1	39	6.4	6.6
	48-57	T	0.19	1800	5.30	6.36	433	346	44.2	42.8	7.3	6.3
		P			5.49	6.24	431	389	44	41.8	7.3	7.5
HG-T2-50	0-2	T	12.34	165000	3.64	5.94	492	277	349	309	81.8	328.6
		P			3.59	6.00	563	246	509	385	267.1	623.5
	2-10	T	0.12	430	5.07	4.35	-105	440	219	187	70.5	413.5
		P			4.55	4.33	-116	433	259	194	205.6	442.6
	10-38	T	0.08	1200	5.05	5.10	300	484	56	57.6	7.1	7.1
		P			5.18	5.19	322	491	43	58.4	7.2	7.2
	38-65	T	0.12	670	5.96	5.48	326	420	57.6	45.2	7.3	6.7
		P			5.66	5.45	397	432	49.3	44	7.2	6.8
HG-T2-75	0-3	T	9.40	51900	6.17	6.40	224	197	735	473	300.7	173.1
		P			6.51	6.43	141	169	1368	513	1116.9	250.9
	3-18	T	8.52	81200	5.88	6.25	377	244	186.4	208	23.6	122.7
		P			5.05	6.11	360	234	186	302	157.0	403.2
	18-38	T	13.77	224000	5.68	6.50	280	155	215	294	68.2	136.3
		P			6.04	na	254	na	275	na	88.2	na
	38-52	T	15.20	209000	5.61	6.33	360	193	217	37.8	68.3	254.9
		P			na	na	na	na	na	na	na	na
	37-140	T	1.48	22300	5.31	5.82	327	279	336	540	143.3	1528.1
		P			5.38	6.21	228	180	523	652	322.6	1761.8
HG-T2-100	0-2	T	7.35	145000	7.03	6.92	178	321	182.8	133.4	13.7	8.8
		P			6.77	6.72	240	277	167.1	134.9	15.1	13.3
	2-24	T	0.33	2800	4.89	9.12	343	288	168	260	100.9	223.5
		P			4.61	9.14	348	263	198	343	176.8	422.6
	25->	T	0.24	1300	5.47	5.35	393	459	79.3	68.5	7.9	7.4
		P			5.43	5.40	407	461	77.1	69.9	7.7	7.5
LSH-T3-50	0-1	T	9.13	1500	5.75	6.25	347	295	122	185	31.8	128.4
		P			5.57	6.32	149	233	154	315	94.6	466.3
	1-3	T	1.11	8500	5.06	5.36	287	432	66.7	60	8.0	7.7
		P			4.80	5.20	423	467	73.8	60	9.1	7.9
	3-6	T	8.37	4800	4.35	4.52	534	464	327	185	48.3	78.2
		P			4.15	4.29	508	480	342	199	70.5	151.5
	6-15	T	0.86	960	5.15	4.39	313	443	313	280	46.9	621.5
		P			4.17	4.37	496	450	294	289	65.5	650.7
	15-28	T	0.15	550	5.89	6.07	303	449	52.5	47.1	6.8	6.4
		P			6.00	6.13	348	449	49.2	46.6	6.6	6.3
	28-63	T	0.14	32600	6.61	6.20	346	345	76.7	49.8	5.7	5.9
		P			6.60	6.33	349	356	72.4	48.3	6.0	5.5

App3-Table2 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH		Eh, mv		Cond, us/cm		Acidity, mg/ L	
					29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
LSH-T3-75	0-14	T	16.30	50400	5.47	6.68	401	392	376	188	103.4	18.7
		P			5.99	6.67	247	394	567	180	251.4	24.3
	14-24	T	19.05	116000	6.02	6.18	348	314	225	187	27.9	123.1
		P			5.06	6.08	398	297	274	258	73.9	315.9
	24-34	T	15.24	13400	4.62	6.22	478	292	170	185	34.7	146.8
		P			5.54	6.10	457	295	189	240	75.5	282.1
	34-40	T	1.04	5200	na	4.67	na	395	na	302	na	566.3
		P			na	na	na	na	na	na	na	na
	40-63	T	0.11	430	5.73	5.83	345	429	49.2	31	6.3	5.7
		P			5.79	5.97	367	424	47.1	32	6.4	6.2
	63-73	T	0.43	3200	4.57	5.82	426	326	193	183.8	177.6	63.9
		P			4.53	5.09	424	379	212	198.1	205.6	153.2
	73-78	T	0.13	660	5.33	6.12	405	387	78.4	48.4	6.2	5.9
		P			5.57	6.05	410	402	81.1	48.9	6.6	6.2
LSH-T3-330	0-33	T	0.29	860	5.67	6.79	350	311	234	176.8	47.6	18.7
		P			5.42	6.08	335	358	279	167	93.9	32.5
	33-39	T	0.11	960	5.98	5.97	259	395	55.1	43.4	6.8	9.1
		P			6.02	6.00	371	406	46.4	44	6.3	6.8
	39-72	T	1.15	3300	5.68	5.08	404	520	66.3	64.3	8.6	8
		P			5.39	5.14	363	512	168.4	65.6	8.6	8.2
LSH-T3-400	2-7	T	1.69	3800	4.59	6.30	490	316	412	131	59.3	24.5
		P			4.29	5.71	512	357	429	132	64.4	36.9
	7-52	T	0.35	1000	4.53	5.76	444	358	167	170.8	137.0	30.7
		P			4.49	5.49	187	377	176	170.9	178.3	45.2
LSH-T3-540	Lichen	T	2.10	3500	na	4.27	na	439	na	353	na	1150.1
		P			na	na	na	na	na	na	na	na
LSH-T4-20	0-21	T	18.11	46800	5.46	5.77	433	372	42.6	24	9.1	8.1
		P			5.50	5.64	462	400	34.4	24	9.2	9.3
	21-36	T	2.58	1300	5.58	5.19	328	383	161.5	182.5	43.5	149.1
		P			4.74	5.00	231	376	187	193.5	87.1	200.5
	36-44	T	0.32	8500	5.05	4.89	487	481	78.8	70.1	8.5	7.7
		P			4.92	4.87	445	484	78.9	51	8.7	8.3
LSH-T4-34	0-10	T	16.68	66000	4.45	6.05	493	345	179	145.8	46.4	49
		P			4.27	5.70	494	369	179	140.5	49.9	56.2
	10-22	T	2.09	3200	5.03	5.32	369	335	197	245	90.6	311.9
		P			4.76	5.38	383	324	240	272	139.1	381.4
	22-32	T	7.08	12600	4.22	6.22	493	291	371	253	60.2	168.3
		P			4.15	5.95	489	315	391	327	79.2	414.4
	32-44	T	1.31	7500	na	5.16	na	407	na	262	na	282.4
		P			na	4.75	na	429	na	277	na	375.4
Seahorse T3 Pond		T	8.52	44400	5.76	6.44	254	174	447	280	364.5	168.6
		P			6.31	6.47	177	146	540	315	366.9	113.1
HG South Pond		T	42.97	72500	5.28	5.588	428	393	14	23.1	8.5	7.3
		P			5.68	6.186	419	384	14	22.9	14	7.8
HG North Large Pond		T	0.66	690	4.59	5.49	371	273	247	212	167.1	96.4
		P			4.46	5.19	362	260	335	232	423.5	189.2
HG North Small Pond		T	10.02	64200	6.75	6.97	296	326	132	82	7.7	5.9
		P			6.61	6.84	168	345	191	84.8	19	7.3
HG North Small Pond R		T			6.23	6.61	167	94	1161	556	551.8	293.8
		P			6.44	6.65	156	97	1018	542	353.3	104.6

Jars with potato waste addition.

App3-Table 3 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	pH				Eh, mv		Cond, us/cm		Acidity, mg/ L	
			29-Oct-01		15-Apr-02		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
Jars without Potato Waste Addition												
HG-T1-0	0-20	T	5.61	2.45E-06	5.88	1.32E-06	41	264	217	355	37.6	747.7
		P	5.20	6.37E-06	5.95	1.14E-06	143	242	208	390	77.8	813.6
	20-32	T	5.32	4.83E-06	5.65	2.22E-06	428	401	105.1	84.9	40.7	36.3
		P	5.40	4.03E-06	5.60	2.50E-06	437	417	98.3	85.8	39.2	38.8
	32-71	T	4.67	2.14E-05	4.62	2.40E-05	404	554	104.2	76.9	15.9	41.2
		P	4.83	1.50E-05	4.58	2.65E-05	346	546	100.1	85.7	15.8	16
HG-T1-50	0-4	T	na	na	5.51	3.10E-06	na	372	na	42.9	na	6.4
		P			5.64	2.30E-06	na	401	na	41.5	na	6.4
	4-60	T	6.36	4.37E-07	7.13	7.40E-08	355	318	89.4	52.8	5.7	5.9
		P	6.47	3.39E-07	7.02	9.62E-08	350	326	86.7	52.7	6.0	6.4
HG-T1-80	5-9	T	na	na	6.14	7.29E-07	na	358	na	30	na	7.4
		P			6.08	8.28E-07	na	375	na	30	na	7.4
	9-41	T	6.70	1.98E-07	7.24	5.78E-08	321	281	81.8	51.9	5.7	24.3
		P	6.68	2.10E-07	7.02	9.46E-08	328	309	81.9	51.6	5.8	6.2
HG-T1-100	4-10	T	5.06	8.69E-06	5.55	2.81E-06	416	383	80.4	55.6	7.7	8.7
		P	4.91	1.23E-05	5.34	4.56E-06	455	413	80.1	47.6	7.7	7.8
	18-42	T	5.41	3.86E-06	5.85	1.41E-06	409	397	76.1	42	6.6	6.4
		P	5.54	2.86E-06	5.90	1.27E-06	421	403	68.8	42	6.6	6.2
	42-60	T	6.02	9.55E-07	6.12	7.62E-07	404	400	72.6	45.3	6.6	6.2
		P	6.06	8.71E-07	6.12	7.64E-07	396	409	68.4	40.8	6.8	6.5
HG-T1-150	0-4	T	5.33	4.73E-06	5.89	1.30E-06	430	412	83.3	49.9	7.6	7.6
		P	5.40	4.02E-06	5.65	2.23E-06	431	418	77.8	50.3	8.7	7.1
	4-6	T	5.28	5.25E-06	6.28	5.22E-07	420	418	71.5	43.5	6.4	6.9
		P	5.40	3.98E-06	6.09	8.20E-07	418	425	72.2	43.7	6.4	6.7
	6-11	T	6.12	7.53E-07	6.90	1.26E-07	391	304	72.5	43.2	6.7	6.1
		P	6.10	7.94E-07	6.72	1.89E-07	380	331	71.4	42.5	6.7	6.1
	11-35	T	6.61	2.44E-07	6.96	1.09E-07	281	342	81	47.2	6.5	6.1
		P	6.85	1.41E-07	6.92	1.19E-07	216	351	68.2	46.7	6.8	5.9
	35-69	T	6.59	2.60E-07	6.77	1.71E-07	270	403	89	68.7	6.30	6.4
		P	6.50	3.13E-07	6.90	1.25E-07	287	394	87.2	55.5	6.6	6.3
HG-T1-200	1-2	T	6.56	2.76E-07	6.94	1.15E-07	318	326	76.8	34	6	7.5
		P	6.61	2.47E-07	6.89	1.29E-07	334	328	76.1	34	5.7	6.3
	2-65	T	5.60	2.52E-06	6.14	7.28E-07	439	357	69.7	27	7.6	6.8
		P	5.97	1.08E-06	6.17	6.81E-07	417	353	70.2	30	79	7
HG-T1-250	5-7	T	5.87	1.36E-06	5.71	1.93E-06	426	444	77.5	48.6	7.2	6.5
		P	5.81	1.57E-06	5.60	2.51E-06	433	451	77.6	34	7.2	7
	11-15	T	5.86	1.39E-06	5.89	1.29E-06	444	393	72.5	43.5	9	6.8
		P	5.73	1.85E-06	6.00	1.01E-06	442	403	73.2	42.9	6.8	6.6
	15-26	T	na	na	6.26	5.52E-07	na	365	na	43.6	na	6.2
		P			6.38	4.18E-07	258	372	na	42	na	6.1
HG-T1-290	10-60	T	6.30	5.02E-07	6.30	5.06E-07	310	397	88.9	55.8	7.1	6.8
		P	6.42	3.85E-07	6.72	1.93E-07	269	407	86.1	56.2	7.1	6.9
HG-T1-300	0-9	T	6.38	4.16E-07	6.18	6.68E-07	235	392	472	161	130.2	42.8
		P	6.50	3.18E-07	6.33	4.70E-07	152	233	635	191	305	86.3
	40-60	T	na	na	5.83	1.47E-06	na	422	na	46.8	na	6.9
		P			5.92	1.20E-06	na	422	na	46	na	7

App3-Table 3 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	pH				Eh, mv		Cond, us/cm		Acidity, mg/ L	
			29-Oct-01		15-Apr-02		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
HG-T2-0	10-27	T	5.63	2.35E-06	5.69	2.03E-06	428	447	38	36.7	7.0	6.4
		P	5.71	1.97E-06	5.66	2.18E-06	428	453	36.6	36.2	7.1	6.8
	27-29	T	4.28	5.22E-05	4.44	3.61E-05	439	462	83.9	74.9	9.8	9.4
		P	4.28	5.26E-05	4.40	4.01E-05	475	483	85.1	76.4	11.6	9.7
	50-57	T	2.90	1.26E-03	2.92	1.20E-03	715	710	624	464	122.9	129.5
		P	2.90	1.25E-03	2.88	1.33E-03	729	728	629	452	123.6	129.8
	57-65	T	3.27	5.40E-04	3.34	4.55E-04	581	663	254	210	42.1	48.7
		P	3.24	5.74E-04	3.36	4.33E-04	589	677	244	216	44.3	43.6
	65-71	T	3.00	1.00E-03	3.03	9.25E-04	634	651	464	343	82.1	86
		P	2.96	1.10E-03	3.36	4.33E-04	643	664	470	339	83.6	88.2
HG-T2-25	0-4	T	7.36	4.40E-08	6.73	1.85E-07	262	300	172.2	64.4	10.7	8
		P	6.64	2.28E-07	6.43	3.69E-07	307	341	165.7	60.1	34.9	13
	10-48	T	5.50	3.13E-06	6.93	1.19E-07	481	299	48.5	38	6.5	5.8
		P	5.68	2.09E-06	6.68	2.11E-07	457	339	44.1	39	6.4	6.6
	48-57	T	5.30	5.04E-06	6.36	4.41E-07	433	346	44.2	42.8	7.3	6.3
		P	5.49	3.25E-06	6.24	5.73E-07	431	389	44	41.8	7.3	7.5
HG-T2-50	10-38	T	5.05	9.02E-06	5.10	7.98E-06	300	484	56	57.6	7.1	7.1
		P	5.18	6.67E-06	5.19	6.44E-06	322	491	43	58.4	7.2	7.2
	38-65	T	5.96	1.09E-06	5.48	3.35E-06	326	420	57.6	45.2	7.3	6.7
		P	5.66	2.19E-06	5.45	3.56E-06	397	432	49.3	44	7.2	6.8
HG-T2-100	0-2	T	7.03	9.31E-08	6.92	1.21E-07	178	321	182.8	133.4	13.7	8.8
		P	6.77	1.68E-07	6.72	1.91E-07	240	277	167.1	134.9	15.1	13.3
	25->	T	5.47	3.36E-06	5.35	4.45E-06	393	459	79.3	68.5	7.9	7.4
		P	5.43	3.68E-06	5.40	4.03E-06	407	461	77.1	69.9	7.7	7.5
LSH-T3-50	1-3	T	5.06	8.63E-06	5.36	4.39E-06	287	432	66.7	60	8.0	7.7
		P	4.80	1.58E-05	5.20	6.28E-06	423	467	73.8	60	9.1	7.9
	15-28	T	5.89	1.30E-06	6.07	8.43E-07	303	449	52.5	47.1	6.8	6.4
		P	6.00	1.01E-06	6.13	7.38E-07	348	449	49.2	46.6	6.6	6.3
	28-63	T	6.61	2.48E-07	6.20	6.28E-07	346	345	76.7	49.8	5.7	5.9
		P	6.60	2.54E-07	6.33	4.71E-07	349	356	72.4	48.3	6.0	5.5
LSH-T3-75	40-63	T	5.73	1.87E-06	5.83	1.49E-06	345	429	49.2	31	6.3	5.7
		P	5.79	1.64E-06	5.97	1.08E-06	367	424	47.1	32	6.4	6.2
	73-78	T	5.33	4.71E-06	6.12	7.62E-07	405	387	78.4	48.4	6.2	5.9
		P	5.57	2.69E-06	6.05	8.97E-07	410	402	81.1	48.9	6.6	6.2
LSH-T3-330	33-39	T	5.98	1.06E-06	5.97	1.07E-06	259	395	55.1	43.4	6.8	9.1
		P	6.02	9.66E-07	6.00	1.01E-06	371	406	46.4	44	6.3	6.8
	39-72	T	5.68	2.08E-06	5.08	8.30E-06	404	520	66.3	64.3	8.6	8
		P	5.39	4.10E-06	5.14	7.26E-06	363	512	168.4	65.6	8.6	8.2
LSH-T4-20	0-21	T	5.46	3.49E-06	5.77	1.71E-06	433	372	42.6	24	9.1	8.1
		P	5.50	3.13E-06	5.64	2.32E-06	462	400	34.4	24	9.2	9.3
	36-44	T	5.05	8.85E-06	4.89	1.29E-05	487	481	78.8	70.1	8.5	7.7
		P	4.92	1.22E-05	4.87	1.36E-05	445	484	78.9	51	8.7	8.3
HG South Pond		T	5.28	5.30E-06	5.588	2.58E-06	428	393	14	23.1	8.5	7.3
		P	5.68	2.11E-06	6.186	6.52E-07	419	384	14	22.9	14	7.8
HG North Small Pond		T	6.75	1.79E-07	6.97	1.08E-07	296	326	132	82	7.7	5.9
		P	6.61	2.45E-07	6.84	1.44E-07	168	345	191	84.8	19	7.3
	N		84	84	92	92	85	92	84	92	84	92

App3-Table 3 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	pH				Eh, mv		Cond, us/cm		Acidity, mg/ L	
			29-Oct-01		15-Apr-02		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
Min			2.90	4.40E-08	2.88	5.78E-08	41	233	14.0	22.9	5.70	5.50
Max			7.36	1.26E-03	7.24	1.33E-03	729	728	635	464	305	814
Avg			4.14	7.24E-05	4.26	5.49E-05	381	412	119	80	21.5	31.8

App3-Table 3 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	pH				Eh, mv		Cond, us/cm		Acidity, mg/ L	
			29-Oct-01		15-Apr-02		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
Jars with Potato Waste Addition												
HG-T1-0	32-71 R	T	5.78	1.65E-06	4.24	5.78E-05	282	391	207	171	43.2	434.7
		P	5.03	9.29E-06	4.26	5.53E-05	258	389	183	180	53	445.2
HG-T1-80	0-5	T	6.37	4.25E-07	6.35	4.47E-07	273	286	348	252	65.1	31.3
		P	6.08	8.28E-07	6.51	3.10E-07	181	177	654	285	505.7	116.4
	5-6	T	7.01	9.79E-08	6.46	3.48E-07	393	281	310	268	17.1	18.9
		P	6.86	1.39E-07	6.58	2.64E-07	206	198	339	297	32.2	75.3
HG-T1-100	0-4	T	6.40	4.03E-07	6.17	6.73E-07	316	282	204	28.1	17.8	294.6
		P	5.36	4.41E-06	6.06	8.79E-07	353	249	226	363	51.8	590.5
	10-18	T	5.80	1.58E-06	4.99	1.03E-05	312	335	193	172	30	215.5
		P	4.90	1.26E-05	4.92	1.21E-05	306	317	222	183	122.6	252.2
HG-T1-150	11-35 R	T	4.89	1.28E-05	4.98	1.05E-05	258	395	218	190.6	106.7	137.6
		P	4.54	2.86E-05	4.81	1.55E-05	258	1811	234	193.1	169.8	164.3
	35-69 R	T	5.02	9.55E-06	5.63	2.37E-06	-13	322	261	198	169.7	139.2
		P	4.80	1.57E-05	5.50	3.17E-06	50	318	356	205	348	142.9
HG-T1-200	0-1	T	6.45	3.55E-07	6.59	2.59E-07	187	331	331	347	30.5	33.5
		P	6.18	6.68E-07	6.52	3.02E-07	251	236	425	368	58.5	208.9
HG-T1-250	0-5	T	5.26	5.51E-06	4.88	1.33E-05	31	395	220	217	53.3	343
		P	4.74	1.84E-05	4.97	1.08E-05	1	369	302	245	280.2	430.2
	26-38	T	4.71	1.96E-05	5.27	5.35E-06	405	378	227	184	119.7	175.2
		P	4.54	2.86E-05	5.06	8.81E-06	392	370	280	201	260.1	231.9
HG-T1-290	0-6	T	4.50	3.17E-05	6.43	3.70E-07	490	299	239	185.3	35.1	46.4
		P	4.47	3.43E-05	6.20	6.30E-07	460	301	265	219	64.6	145.2
	6-10	T	4.68	2.08E-05	5.08	8.38E-06	480	392	345	244	49.4	236.2
		P	4.32	4.79E-05	na		489	na	368	n	74.4	na
	10-60 R	T	4.97	1.06E-05	4.84	1.46E-05	-54	385	243	190	87.5	239.3
		P	4.85	1.42E-05	4.67	2.15E-05	89	389	265	199	158.6	297.5
HG-T1-300	0-9 R	T	6.51	3.06E-07	6.76	1.73E-07	258	332	690	197	288	24.1
		P	6.52	3.02E-07	6.58	2.62E-07	258	275	932	206	487.8	37.9
	9-36	T	4.30	5.06E-05	6.11	7.85E-07	479	300	424	149.5	116.9	60.9
		P	4.35	4.52E-05	6.19	6.50E-07	443	239	473	211	185.2	164.5
	37-40	T	4.36	4.33E-05	3.981	1.04E-04	511	503	506	313	84.6	128.2
		P	3.99	1.02E-04	4.102	7.91E-05	551	514	521	325	97.8	89.8
HG-T2-0	0-10	T	6.14	7.26E-07	5.97	1.08E-06	242	290	521	315	281.7	445.1
		P	6.27	5.32E-07	6.48	3.33E-07	209	139	794	364	523.1	369
	29-50	T	3.17	6.76E-04	3.55	2.82E-04	574	570	512	376	106.9	307.4
		P	3.16	6.90E-04	3.55	2.85E-04	580	531	524	399	123.9	370.1
hG-T2-25	4-10	T	6.04	9.18E-07	6.82	1.53E-07	337	297	186	243	36.4	34.7
		P	4.92	1.19E-05	6.60	2.49E-07	416	181	320	275	196.3	69
HG-T2-50	0-2	T	3.64	2.29E-04	5.94	1.15E-06	492	277	349	309	81.8	328.6
		P	3.59	2.57E-04	6.00	9.91E-07	563	246	509	385	267.1	623.5
	2-10	T	5.07	8.55E-06	4.35	4.47E-05	-105	440	219	187	70.5	413.5
		P	4.55	2.80E-05	4.33	4.68E-05	-116	433	259	194	205.6	442.6
	0-3	T	6.17	6.82E-07	6.40	4.00E-07	224	197	735	473	300.7	173.1
		P	6.51	3.12E-07	6.43	3.69E-07	141	169	1368	513	1116.9	250.9
	3-18	T	5.88	1.32E-06	6.25	5.66E-07	377	244	186.4	208	23.6	122.7
		P	5.05	8.97E-06	6.11	7.69E-07	360	234	186	302	157.0	403.2

App3-Table 3 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	pH				Eh, mv		Cond, us/cm		Acidity, mg/ L	
			29-Oct-01		15-Apr-02		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
HG-T2-75	18-38	T	5.68	2.08E-06	6.50	3.16E-07	280	155	215	294	68.2	136.3
		P	6.04	9.18E-07	na		254	na	275	na	88.2	na
	38-52	T	5.61	2.43E-06	6.33	4.67E-07	360	193	217	37.8	68.3	254.9
		P	na	na	na	na	na	na	na	na	na	na
	37-140	T	5.31	4.88E-06	5.82	1.51E-06	327	279	336	540	143.3	1528.1
		P	5.38	4.20E-06	6.21	6.21E-07	228	180	523	652	322.6	1761.8
HG-T2-100	2-24	T	4.89	1.30E-05	9.12	7.59E-10	343	288	168	260	100.9	223.5
		P	4.61	2.47E-05	9.14	7.29E-10	348	263	198	343	176.8	422.6
LSH-T3-50	0-1	T	5.75	1.79E-06	6.25	5.61E-07	347	295	122	185	31.8	128.4
		P	5.57	2.68E-06	6.32	4.80E-07	149	233	154	315	94.6	466.3
	3-6	T	4.35	4.47E-05	4.52	3.03E-05	534	464	327	185	48.3	78.2
		P	4.15	7.14E-05	4.29	5.15E-05	508	480	342	199	70.5	151.5
	6-15	T	5.15	7.13E-06	4.39	4.10E-05	313	443	313	280	46.9	621.5
		P	4.17	6.75E-05	4.37	4.26E-05	496	450	294	289	65.5	650.7
LSH-T3-75	0-14	T	5.47	3.36E-06	6.68	2.07E-07	401	392	376	188	103.4	18.7
		P	5.99	1.03E-06	6.67	2.15E-07	247	394	567	180	251.4	24.3
	14-24	T	6.02	9.59E-07	6.18	6.68E-07	348	314	225	187	27.9	123.1
		P	5.06	8.79E-06	6.08	8.28E-07	398	297	274	258	73.9	315.9
	24-34	T	4.62	2.43E-05	6.22	6.08E-07	478	292	170	185	34.7	146.8
		P	5.54	2.87E-06	6.10	8.02E-07	457	295	189	240	75.5	282.1
	34-40	T	na	na	4.67	2.15E-05	na	395	na	302	na	566.3
		P	na	na	na		na	na	na	na	na	na
	63-73	T	4.57	2.71E-05	5.82	1.50E-06	426	326	193	183.8	177.6	63.9
		P	4.53	2.97E-05	5.09	8.13E-06	424	379	212	198.1	205.6	153.2
LSH-T3-330	0-33	T	5.67	2.13E-06	6.79	1.64E-07	350	311	234	176.8	47.6	18.7
		P	5.42	3.78E-06	6.08	8.28E-07	335	358	279	167	93.9	32.5
LSH-T3-400	2-7	T	4.59	2.55E-05	6.30	5.06E-07	490	316	412	131	59.3	24.5
		P	4.29	5.08E-05	5.71	1.96E-06	512	357	429	132	64.4	36.9
	7-52	T	4.53	2.92E-05	5.76	1.73E-06	444	358	167	170.8	137.0	30.7
		P	4.49	3.24E-05	5.49	3.26E-06	187	377	176	170.9	178.3	45.2
LSH-T3-540	Lichen	T	na	na	4.27	5.38E-05	na	439	na	353	na	1150.1
		P	na	na	na	na	na	na	na	na	na	na
LSH-T4-20	21-36	T	5.58	2.64E-06	5.19	6.43E-06	328	383	161.5	182.5	43.5	149.1
		P	4.74	1.82E-05	5.00	9.91E-06	231	376	187	193.5	87.1	200.5
LSH-T4-34	0-10	T	4.45	3.58E-05	6.05	8.93E-07	493	345	179	145.8	46.4	49
		P	4.27	5.37E-05	5.70	2.02E-06	494	369	179	140.5	49.9	56.2
	10-22	T	5.03	9.33E-06	5.32	4.83E-06	369	335	197	245	90.6	311.9
		P	4.76	1.73E-05	5.38	4.13E-06	383	324	240	272	139.1	381.4
	22-32	T	4.22	6.10E-05	6.22	6.01E-07	493	291	371	253	60.2	168.3
		P	4.15	7.16E-05	5.95	1.13E-06	489	315	391	327	79.2	414.4
	32-44	T	na	na	5.16	6.87E-06	na	407	na	262	na	282.4
		P	na	na	4.75	1.78E-05	na	429	na	277	na	375.4
Seahorse T3 Pond		T	5.76	1.72E-06	6.44	3.61E-07	254	174	447	280	364.5	168.6
		P	6.31	4.86E-07	6.47	3.40E-07	177	146	540	315	366.9	113.1
HG North Large Pond		T	4.59	2.58E-05	5.49	3.21E-06	371	273	247	212	167.1	96.4
		P	4.46	3.48E-05	5.19	6.49E-06	362	260	335	232	423.5	189.2
HG North Small Pond R		T	6.23	5.90E-07	6.61	2.45E-07	167	94	1161	556	551.8	293.8
		P	6.44	3.64E-07	6.65	2.25E-07	156	97	1018	542	353.3	104.6
	N		87	87	89	89	87	89	87	89	87	89
	Min		3.16	9.79E-08	3.55	7.29E-10	-116	94	122	28	17	19

App3-Table 3 : Comparison of Top and Pore Water Chemistry

Location	Depth (cm)	Top / Pore Water	pH				Eh, mv		Cond, us/cm		Acidity, mg/ L	
			29-Oct-01		15-Apr-02		29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
	Max		7.01	6.90E-04	9.14	2.85E-04	580	1811	1368	652	1117	1762
	Avg		4.41	3.88E-05	4.82	1.52E-05	324	336	353	256	154	260

Jars with potato waste addition.

App3-Table 4 : Comparison of water pH for Top and Pore water in Key Lake Jars

					29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
					pH	pH	Eh, mv	Eh, mv	Cond, us/cm	Cond, us/cm	Acidity, mg/ L	Acidity, mg/ L
Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days
HG-T1-0	32-71	Top	2.97	470	4.67	4.62	404	554	104.2	76.9	15.9	41.2
		Pore	2.97	470	4.83	4.58	346	546	100.1	85.7	15.8	16
HG-T1-100	10-18	P	0.27	590	4.90	4.92	455	413	80.1	47.6	7.7	7.8
	4-10	P	0.70	2000	4.91	5.34	306	317	222	183	122.6	252.2
HG-T1-150	11-35 R	Top	0.11	740	4.89	4.98	258	395	218	190.6	106.7	137.6
		Pore	0.11	740	4.54	4.81	258	1811	234	193.1	169.8	164.3
	35-69 R	P	0.17	1400	4.80	5.50	50	318	356	205	348	142.9
HG-T1-250	0-5	P	0.22	870	4.74	4.97	1	369	302	245	280.2	430.2
	26-38	Top	0.23	2700	4.71	5.27	405	378	227	184	119.7	175.2
		Pore	0.23	2700	4.54	5.06	392	370	280	201	260.1	231.9
HG-T1-290	0-6	Top	36.5	112000	4.50	6.43	490	299	239	185.3	35.1	46.4
		Pore	36.5	112000	4.47	6.20	460	301	265	219	64.6	145.2
	6-10	Top	0.87	9500	4.68	5.08	480	392	345	244	49.4	236.2
		Pore	0.87	9500	4.32		489	na	368	n	74.4	na
	10-60 R	Top	0.32	1000	4.97	4.84	-54	385	243	190	87.5	239.3
		Pore	0.32	1000	4.85	4.67	89	389	265	199	158.6	297.5
HG-T1-300	9-36	Top	35.70	134000	4.30	6.11	479	300	424	149.5	116.9	60.9
		Pore	35.70	134000	4.35	6.19	443	239	473	211	185.2	164.5
	37-40	Top	5.91	11800	4.36	3.98	511	503	506	313	84.6	128.2
		Pore	5.91	11800	3.99	4.10	551	514	521	325	97.8	89.8
HG-T2-0	27-29	Top	1.25	9000	4.28	4.44	439	462	83.9	74.9	9.8	9.4
		Pore	1.25	9000	4.28	4.40	475	483	85.1	76.4	11.6	9.7
	29-50	Top	3.13	78400	3.17	3.55	574	570	512	376	106.9	307.4
		Pore	3.13	78400	3.16	3.55	580	531	524	399	123.9	370.1
	50-57	Top	2.91	3400	2.90	2.92	715	710	624	464	122.9	129.5
		Pore	2.91	3400	2.90	2.88	729	728	629	452	123.6	129.8
	57-65	Top	0.67	1400	3.27	3.34	581	663	254	210	42.1	48.7
		Pore	0.67	1400	3.24	3.36	589	677	244	216	44.3	43.6
	65-71	Top	0.45	9500	3.00	3.03	634	651	464	343	82.1	86
		Pore	0.45	9500	2.96	3.36	643	664	470	339	83.6	88.2
HG-T2-100	2-24	Top	0.33	2800	4.89	**6.12**	343	288	168	260	100.9	223.5
		Pore	0.33	2800	4.61	**6.14**	348	263	198	343	176.8	422.6
HG-T2-25	4-10	P	0.28	3300	4.92	6.60	416	181	320	275	196.3	69
HG-T2-50	0-2	Top	12.34	165000	3.64	5.94	492	277	349	309	81.8	328.6
		Pore	12.34	165000	3.59	6.00	563	246	509	385	267.1	623.5
	2-10	P	0.12	430	4.55	4.33	-116	433	259	194	205.6	442.6
LSH-T3-50	1-3	P	1.11	8500	4.80	5.20	423	467	73.8	60	9.1	7.9
	3-6	Top	8.37	4800	4.35	4.52	534	464	327	185	48.3	78.2
		Pore	8.37	4800	4.15	4.29	508	480	342	199	70.5	151.5
	6-15	P	0.86	960	4.17	4.37	496	450	294	289	65.5	650.7
LSH-T3-75	24-34	Top	15.24	13400	4.62	6.22	478	292	170	185	34.7	146.8
	63-73	Top	0.43	3200	4.57	5.82	426	326	193	183.8	177.6	63.9
		Pore	0.43	3200	4.53	5.09	424	379	212	198.1	205.6	153.2
LSH-T3-400	2-7	Top	1.69	3800	4.59	6.30	490	316	412	131	59.3	24.5
		Pore	1.69	3800	4.29	5.71	512	357	429	132	64.4	36.9
	7-52	Top	0.35	1000	4.53	5.76	444	358	167	170.8	137.0	30.7
		Pore	0.35	1000	4.49	5.49	187	377	176	170.9	178.3	45.2
LSH-T4-20	21-36	P	2.58	1300	4.74	5.00	231	376	187	193.5	87.1	200.5
	36-44	P	0.32	8500	4.92	4.87	445	484	78.9	51	8.7	8.3
LSH-T4-34	0-10	Top	16.68	66000	4.45	6.05	493	345	179	145.8	46.4	49
		Pore	16.68	66000	4.27	5.70	494	369	179	140.5	49.9	56.2
	22-32	Top	7.08	12600	4.22	6.22	383	324	240	272	139.1	381.4
		Pore	7.08	12600	4.15	5.95	493	291	371	253	60.2	168.3
	10-22	P	2.09	3200	4.76	5.38	489	315	391	327	79.2	414.4
HG North Large Pond		Top	0.66	690	4.59	5.49	371	273	247	212	167.1	96.4
		Pore	0.66	690	4.46	5.19	362	260	335	232	423.5	189.2
				Min	**4.97**	**6.60**	**-116**	**181**	**74**	**48**	**8**	**8**
				Max	**2.90**	**0.00**	**729**	**1811**	**629**	**464**	**424**	**651**
				Avg	**3.79**	**1.75**	**420**	**435**	**294**	**220**	**112**	**169**

Jars with potato waste addition.

App3-Table 4b: : pH Comparison for Jars without Potato (pH < 5)

Table : Comparison of water pH for Top and Pore water in Key Lake Jars

					29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
					pH	pH	Eh, mv	Eh, mv	Cond, us/cm	Cond, us/cm	Acidity, mg/ L	Acidity, mg/ L
Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days
HG-T1-0	32-71	Top	2.97	470	4.67	4.62	404	554	104.2	76.9	15.9	41.2
		Pore	2.97	470	4.83	4.58	346	546	100.1	85.7	15.8	16
HG-T1-100	4-10	P	0.70	2000	4.91	5.34	306	317	222	183	122.6	252.2
HG-T2-0	27-29	Top	1.25	9000	4.28	4.44	439	462	83.9	74.9	9.8	9.4
		Pore	1.25	9000	4.28	4.40	475	483	85.1	76.4	11.6	9.7
	50-57	Top	2.91	3400	2.90	2.92	715	710	624	464	122.9	129.5
		Pore	2.91	3400	2.90	2.88	729	728	629	452	123.6	129.8
	57-65	Top	0.67	1400	3.27	3.34	581	663	254	210	42.1	48.7
		Pore	0.67	1400	3.24	3.36	589	677	244	216	44.3	43.6
	65-71	Top	0.45	9500	3.00	3.03	634	651	464	343	82.1	86
		Pore	0.45	9500	2.96	3.36	643	664	470	339	83.6	88.2
LSH-T3-50	1-3	P	1.11	8500	4.80	5.20	423	467	73.8	60	9.1	7.9
LSH-T4-20	36-44	P	0.32	8500	4.92	4.87	445	484	78.9	51	8.7	8.3
				Min	**4.92**	**5.34**	**306**	**317**	**74**	**51**	**9**	**8**
				Max	**2.90**	**2.88**	**729**	**728**	**629**	**464**	**124**	**252**
				Avg	**3.34**	**3.42**	**518**	**570**	**264**	**202**	**53**	**67**

App3-Table 4c: : pH Comparison for Jars with Potato (pH < 5)

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	29-Oct-01 pH 1187 days	15-Apr-02 pH 1355 days	29-Oct-01 Eh, mv 1187 days	15-Apr-02 Eh, mv 1355 days	29-Oct-01 Cond, us/cm 1187 days	15-Apr-02 Cond, us/cm 1355 days	29-Oct-01 Acidity, mg/ L 1187 days	15-Apr-02 Acidity, mg/ L 1355 days
HG-T1-100	10-18	P	0.27	590	4.90	4.92	455	413	80.1	47.6	7.7	7.8
HG-T1-150	11-35 R	Top	0.11	740	4.89	4.98	258	395	218	190.6	106.7	137.6
		Pore	0.11	740	4.54	4.81	258	1811	234	193.1	169.8	164.3
	35-69 R	P	0.17	1400	4.80	5.50	50	318	356	205	348	142.9
HG-T1-250	0-5	P	0.22	870	4.74	4.97	1	369	302	245	280.2	430.2
	26-38	Top	0.23	2700	4.71	5.27	405	378	227	184	119.7	175.2
		Pore	0.23	2700	4.54	5.06	392	370	280	201	260.1	231.9
HG-T1-290	0-6	Top	36.5	112000	4.50	6.43	490	299	239	185.3	35.1	46.4
		Pore	36.5	112000	4.47	6.20	460	301	265	219	64.6	145.2
	6-10	Top	0.87	9500	4.68	5.08	480	392	345	244	49.4	236.2
		Pore	0.87	9500	4.32		489	na	368	n	74.4	na
	10-60 R	Top	0.32	1000	4.97	4.84	-54	385	243	190	87.5	239.3
		Pore	0.32	1000	4.85	4.67	89	389	265	199	158.6	297.5
HG-T1-300	9-36	Top	35.70	134000	4.30	6.11	479	300	424	149.5	116.9	60.9
		Pore	35.70	134000	4.35	6.19	443	239	473	211	185.2	164.5
	37-40	Top	5.91	11800	4.36	3.98	511	503	506	313	84.6	128.2
		Pore	5.91	11800	3.99	4.10	551	514	521	325	97.8	89.8
HG-T2-0	29-50	Top	3.13	78400	3.17	3.55	574	570	512	376	106.9	307.4
		Pore	3.13	78400	3.16	3.55	580	531	524	399	123.9	370.1
HG-T2-100	2-24	Top	0.33	2800	4.89	**6.12**	343	288	168	260	100.9	223.5
		Pore	0.33	2800	4.61	**6.14**	348	263	198	343	176.8	422.6
HG-T2-25	4-10	P	0.28	3300	4.92	6.60	416	181	320	275	196.3	69
HG-T2-50	0-2	Top	12.34	165000	3.64	5.94	492	277	349	309	81.8	328.6
		Pore	12.34	165000	3.59	6.00	563	246	509	385	267.1	623.5
	2-10	P	0.12	430	4.55	4.33	-116	433	259	194	205.6	442.6
LSH-T3-50	3-6	Top	8.37	4800	4.35	4.52	534	464	327	185	48.3	78.2
		Pore	8.37	4800	4.15	4.29	508	480	342	199	70.5	151.5
	6-15	P	0.86	960	4.17	4.37	496	450	294	289	65.5	650.7
LSH-T3-75	24-34	Top	15.24	13400	4.62	6.22	478	292	170	185	34.7	146.8
	63-73	Top	0.43	3200	4.57	5.82	426	326	193	183.8	177.6	63.9
		Pore	0.43	3200	4.53	5.09	424	379	212	198.1	205.6	153.2
LSH-T3-400	2-7	Top	1.69	3800	4.59	6.30	490	316	412	131	59.3	24.5
		Pore	1.69	3800	4.29	5.71	512	357	429	132	64.4	36.9
	7-52	Top	0.35	1000	4.53	5.76	444	358	167	170.8	137.0	30.7
		Pore	0.35	1000	4.49	5.49	187	377	176	170.9	178.3	45.2
LSH-T4-20	21-36	P	2.58	1300	4.74	5.00	231	376	187	193.5	87.1	200.5
LSH-T4-34	0-10	Top	16.68	66000	4.45	6.05	493	345	179	145.8	46.4	49
		Pore	16.68	66000	4.27	5.70	494	369	179	140.5	49.9	56.2
	22-32	Top	7.08	12600	4.22	6.22	383	324	240	272	139.1	381.4
		Pore	7.08	12600	4.15	5.95	493	291	371	253	60.2	168.3
	10-22	P	2.09	3200	4.76	5.38	489	315	391	327	79.2	414.4
HG North Large Pond		Top	0.66	690	4.59	5.49	371	273	247	212	167.1	96.4
		Pore	0.66	690	4.46	5.19	362	260	335	232	423.5	189.2
				Min	**4.97**	**6.60**	**-116**	**181**	**80**	**48**	**8**	**8**
				Max	**3.16**	**0.00**	**580**	**1811**	**524**	**399**	**424**	**651**
				Avg	**4.13**	**1.63**	**390**	**393**	**303**	**225**	**130**	**201**

Jars with potato waste addition.

App3-Table 5a: Data for Eh figs (Jars with Top water pH <5)

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	29-Oct-01 pH 1187 days	15-Apr-02 pH 1355 days	29-Oct-01 Eh, mv 1187 days	15-Apr-02 Eh, mv 1355 days	29-Oct-01 Cond, us/cm 1187 days	15-Apr-02 Cond, us/cm 1355 days	29-Oct-01 Acidity, mg/ L 1187 days	15-Apr-02 Acidity, mg/ L 1355 days
HG-T1-0	32-71	Top	2.97	470	4.67	4.62	404	554	104.2	76.9	15.9	41.2
		Pore	2.97	470	4.83	4.58	346	546	100.1	85.7	15.8	16
HG-T1-100	10-18	P	0.27	590	4.90	4.92	455	413	80.1	47.6	7.7	7.8
	4-10	P	0.70	2000	4.91	5.34	306	317	222	183	122.6	252.2
HG-T1-150	11-35 R	Top	0.11	740	4.89	4.98	258	395	218	190.6	106.7	137.6
		Pore	0.11	740	4.54	4.81	258	411	234	193.1	169.8	164.3
	35-69 R	P	0.17	1400	4.80	5.50	50	318	356	205	348	142.9
HG-T1-250	0-5	P	0.22	870	4.74	4.97	1	369	302	245	280.2	430.2
	26-38	Top	0.23	2700	4.71	5.27	405	378	227	184	119.7	175.2
		Pore	0.23	2700	4.54	5.06	392	370	280	201	260.1	231.9
HG-T1-290	0-6	Top	36.5	112000	4.50	6.43	490	299	239	185.3	35.1	46.4
		Pore	36.5	112000	4.47	6.20	460	301	265	219	64.6	145.2
	6-10	Top	0.87	9500	4.68	5.08	480	392	345	244	49.4	236.2
		Pore	0.87	9500	4.32		489	na	368	n	74.4	na
	10-60 R	Top	0.32	1000	4.97	4.84	-54	385	243	190	87.5	239.3
		Pore	0.32	1000	4.85	4.67	89	389	265	199	158.6	297.5
HG-T1-300	9-36	Top	35.70	134000	4.30	6.11	479	300	424	149.5	116.9	60.9
		Pore	35.70	134000	4.35	6.19	443	239	473	211	185.2	164.5
	37-40	Top	5.91	11800	4.36	3.98	511	503	506	313	84.6	128.2
		Pore	5.91	11800	3.99	4.10	551	514	521	325	97.8	89.8
HG-T2-0	27-29	Top	1.25	9000	4.28	4.44	439	462	83.9	74.9	9.8	9.4
		Pore	1.25	9000	4.28	4.40	475	483	85.1	76.4	11.6	9.7
	29-50	Top	3.13	78400	3.17	3.55	574	570	512	376	106.9	307.4
		Pore	3.13	78400	3.16	3.55	580	531	524	399	123.9	370.1
	50-57	Top	2.91	3400	2.90	2.92	715	710	624	464	122.9	129.5
		Pore	2.91	3400	2.90	2.88	729	728	629	452	123.6	129.8
	57-65	Top	0.67	1400	3.27	3.34	581	663	254	210	42.1	48.7
		Pore	0.67	1400	3.24	3.36	589	677	244	216	44.3	43.6
	65-71	Top	0.45	9500	3.00	3.03	634	651	464	343	82.1	86
		Pore	0.45	9500	2.96	3.36	643	664	470	339	83.6	88.2

App3-Table 5a: Data for Eh figs (Jars with Top water pH <5)

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	29-Oct-01 pH 1187 days	15-Apr-02 pH 1355 days	29-Oct-01 Eh, mv 1187 days	15-Apr-02 Eh, mv 1355 days	29-Oct-01 Cond, us/cm 1187 days	15-Apr-02 Cond, us/cm 1355 days	29-Oct-01 Acidity, mg/ L 1187 days	15-Apr-02 Acidity, mg/ L 1355 days
HG-T2-100	2-24	Top	0.33	2800	4.89	6.12	343	288	168	260	100.9	223.5
		Pore	0.33	2800	4.61	6.14	348	263	198	343	176.8	422.6
HG-T2-25	4-10	P	0.28	3300	4.92	6.60	416	181	320	275	196.3	69
HG-T2-50	0-2	Top	12.34	165000	3.64	5.94	492	277	349	309	81.8	328.6
		Pore	12.34	165000	3.59	6.00	563	246	509	385	267.1	623.5
	2-10	P	0.12	430	4.55	4.33	-116	433	259	194	205.6	442.6
LSH-T3-50	1-3	P	1.11	8500	4.80	5.20	423	467	73.8	60	9.1	7.9
	3-6	Top	8.37	4800	4.35	4.52	534	464	327	185	48.3	78.2
		Pore	8.37	4800	4.15	4.29	508	480	342	199	70.5	151.5
	6-15	P	0.86	960	4.17	4.37	496	450	294	289	65.5	650.7
LSH-T3-75	24-34	Top	15.24	13400	4.62	6.22	478	292	170	185	34.7	146.8
	63-73	Top	0.43	3200	4.57	5.82	426	326	193	183.8	177.6	63.9
		Pore	0.43	3200	4.53	5.09	424	379	212	198.1	205.6	153.2
LSH-T3-400	2-7	Top	1.69	3800	4.59	6.30	490	316	412	131	59.3	24.5
		Pore	1.69	3800	4.29	5.71	512	357	429	132	64.4	36.9
	7-52	Top	0.35	1000	4.53	5.76	444	358	167	170.8	137.0	30.7
		Pore	0.35	1000	4.49	5.49	187	377	176	170.9	178.3	45.2
LSH-T4-20	21-36	P	2.58	1300	4.74	5.00	231	376	187	193.5	87.1	200.5
	36-44	P	0.32	8500	4.92	4.87	445	484	78.9	51	8.7	8.3
LSH-T4-34	0-10	Top	16.68	66000	4.45	6.05	493	345	179	145.8	46.4	49
		Pore	16.68	66000	4.27	5.70	494	369	179	140.5	49.9	56.2
	22-32	Top	7.08	12600	4.22	6.22	383	324	240	272	139.1	381.4
		Pore	7.08	12600	4.15	5.95	493	291	371	253	60.2	168.3
	10-22	P	2.09	3200	4.76	5.38	489	315	391	327	79.2	414.4
HG North Large Pond		Top	0.66	690	4.59	5.49	371	273	247	212	167.1	96.4
		Pore	0.66	690	4.46	5.19	362	260	335	232	423.5	189.2
				Min	**4.97**	**6.60**	**-116**	**181**	**74**	**48**	**8**	**8**
				Max	**2.90**	**0.00**	**729**	**728**	**629**	**464**	**424**	**651**
				Avg	**3.79**	**1.75**	**420**	**410**	**294**	**220**	**112**	**169**

Jars with potato waste addition.

App3-Table 5b: Data for Conductivity figs (Jars with Top water pH <5)

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	29-Oct-01 pH 1187 days	15-Apr-02 pH 1355 days	29-Oct-01 Eh, mv 1187 days	15-Apr-02 Eh, mv 1355 days	29-Oct-01 Cond, us/cm 1187 days	15-Apr-02 Cond, us/cm 1355 days	29-Oct-01 Acidity, mg/ L 1187 days	15-Apr-02 Acidity, mg/ L 1355 days
HG-T1-0	32-71	Top	2.97	470	4.67	4.62	404	554	104.2	76.9	15.9	41.2
		Pore	2.97	470	4.83	4.58	346	546	100.1	85.7	15.8	16
HG-T1-100	10-18	P	0.27	590	4.90	4.92	455	413	80.1	47.6	7.7	7.8
	4-10	P	0.70	2000	4.91	5.34	306	317	222	183	122.6	252.2
HG-T1-150	11-35 R	Top	0.11	740	4.89	4.98	258	395	218	190.6	106.7	137.6
		Pore	0.11	740	4.54	4.81	258	411	234	193.1	169.8	164.3
	35-69 R	P	0.17	1400	4.80	5.50	50	318	356	205	348	142.9
HG-T1-250	0-5	P	0.22	870	4.74	4.97	1	369	302	245	280.2	430.2
	26-38	Top	0.23	2700	4.71	5.27	405	378	227	184	119.7	175.2
		Pore	0.23	2700	4.54	5.06	392	370	280	201	260.1	231.9
HG-T1-290	0-6	Top	36.5	112000	4.50	6.43	490	299	239	185.3	35.1	46.4
		Pore	36.5	112000	4.47	6.20	460	301	265	219	64.6	145.2
	6-10	Top	0.87	9500	4.68	5.08	480	392	345	244	49.4	236.2
		Pore	0.87	9500	4.32		489	na	368	n	74.4	na
	10-60 R	Top	0.32	1000	4.97	4.84	-54	385	243	190	87.5	239.3
		Pore	0.32	1000	4.85	4.67	89	389	265	199	158.6	297.5
HG-T1-300	9-36	Top	35.70	134000	4.30	6.11	479	300	424	149.5	116.9	60.9
		Pore	35.70	134000	4.35	6.19	443	239	473	211	185.2	164.5
	37-40	Top	5.91	11800	4.36	3.98	511	503	506	313	84.6	128.2
		Pore	5.91	11800	3.99	4.10	551	514	521	325	97.8	89.8
HG-T2-0	27-29	Top	1.25	9000	4.28	4.44	439	462	83.9	74.9	9.8	9.4
		Pore	1.25	9000	4.28	4.40	475	483	85.1	76.4	11.6	9.7
	29-50	Top	3.13	78400	3.17	3.55	574	570	512	376	106.9	307.4
		Pore	3.13	78400	3.16	3.55	580	531	524	399	123.9	370.1
	50-57	Top	2.91	3400	2.90	2.92	715	710	624	464	122.9	129.5
		Pore	2.91	3400	2.90	2.88	729	728	629	452	123.6	129.8
	57-65	Top	0.67	1400	3.27	3.34	581	663	254	210	42.1	48.7
		Pore	0.67	1400	3.24	3.36	589	677	244	216	44.3	43.6
	65-71	Top	0.45	9500	3.00	3.03	634	651	464	343	82.1	86
		Pore	0.45	9500	2.96	3.36	643	664	470	339	83.6	88.2

App3-Table 5b: Data for Conductivity figs (Jars with Top water pH <5)

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	29-Oct-01 pH 1187 days	15-Apr-02 pH 1355 days	29-Oct-01 Eh, mv 1187 days	15-Apr-02 Eh, mv 1355 days	29-Oct-01 Cond, us/cm 1187 days	15-Apr-02 Cond, us/cm 1355 days	29-Oct-01 Acidity, mg/ L 1187 days	15-Apr-02 Acidity, mg/ L 1355 days
HG-T2-100	2-24	Top	0.33	2800	4.89	6.12	343	288	168	260	100.9	223.5
		Pore	0.33	2800	4.61	6.14	348	263	198	343	176.8	422.6
HG-T2-25	4-10	P	0.28	3300	4.92	6.60	416	181	320	275	196.3	69
HG-T2-50	0-2	Top	12.34	165000	3.64	5.94	492	277	349	309	81.8	328.6
		Pore	12.34	165000	3.59	6.00	563	246	509	385	267.1	623.5
	2-10	P	0.12	430	4.55	4.33	-116	433	259	194	205.6	442.6
LSH-T3-50	1-3	P	1.11	8500	4.80	5.20	423	467	73.8	60	9.1	7.9
	3-6	Top	8.37	4800	4.35	4.52	534	464	327	185	48.3	78.2
		Pore	8.37	4800	4.15	4.29	508	480	342	199	70.5	151.5
	6-15	P	0.86	960	4.17	4.37	496	450	294	289	65.5	650.7
LSH-T3-75	24-34	Top	15.24	13400	4.62	6.22	478	292	170	185	34.7	146.8
	63-73	Top	0.43	3200	4.57	5.82	426	326	193	183.8	177.6	63.9
		Pore	0.43	3200	4.53	5.09	424	379	212	198.1	205.6	153.2
LSH-T3-400	2-7	Top	1.69	3800	4.59	6.30	490	316	412	131	59.3	24.5
		Pore	1.69	3800	4.29	5.71	512	357	429	132	64.4	36.9
	7-52	Top	0.35	1000	4.53	5.76	444	358	167	170.8	137.0	30.7
		Pore	0.35	1000	4.49	5.49	187	377	176	170.9	178.3	45.2
LSH-T4-20	21-36	P	2.58	1300	4.74	5.00	231	376	187	193.5	87.1	200.5
	36-44	P	0.32	8500	4.92	4.87	445	484	78.9	51	8.7	8.3
LSH-T4-34	0-10	Top	16.68	66000	4.45	6.05	493	345	179	145.8	46.4	49
		Pore	16.68	66000	4.27	5.70	494	369	179	140.5	49.9	56.2
	22-32	Top	7.08	12600	4.22	6.22	383	324	240	272	139.1	381.4
		Pore	7.08	12600	4.15	5.95	493	291	371	253	60.2	168.3
	10-22	P	2.09	3200	4.76	5.38	489	315	391	327	79.2	414.4
HG North Large Pond		Top	0.66	690	4.59	5.49	371	273	247	212	167.1	96.4
		Pore	0.66	690	4.46	5.19	362	260	335	232	423.5	189.2
				Min	**4.97**	**6.60**	**-116**	**181**	**74**	**48**	**8**	**8**
				Max	**2.90**	**0.00**	**729**	**728**	**629**	**464**	**424**	**651**
				Avg	**3.79**	**1.75**	**420**	**410**	**294**	**220**	**112**	**169**

Jars with potato waste addition.

App3-Table 5c: Data for Acidity figs (Jars with Top water pH <5)

					29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02	29-Oct-01	15-Apr-02
					pH	pH	Eh, mv	Eh, mv	Cond, us/cm	Cond, us/cm	Acidity, mg/ L	Acidity, mg/ L
Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days	1187 days	1355 days
HG-T1-0	32-71	Top	2.97	470	4.67	4.62	404	554	104.2	76.9	15.9	41.2
		Pore	2.97	470	4.83	4.58	346	546	100.1	85.7	15.8	16
HG-T1-100	10-18	P	0.27	590	4.90	4.92	455	413	80.1	47.6	7.7	7.8
	4-10	P	0.70	2000	4.91	5.34	306	317	222	183	122.6	252.2
HG-T1-150	11-35 R	Top	0.11	740	4.89	4.98	258	395	218	190.6	106.7	137.6
		Pore	0.11	740	4.54	4.81	258	411	234	193.1	169.8	164.3
	35-69 R	P	0.17	1400	4.80	5.50	50	318	356	205	348	142.9
HG-T1-250	0-5	P	0.22	870	4.74	4.97	1	369	302	245	280.2	430.2
	26-38	Top	0.23	2700	4.71	5.27	405	378	227	184	119.7	175.2
		Pore	0.23	2700	4.54	5.06	392	370	280	201	260.1	231.9
HG-T1-290	0-6	Top	36.5	112000	4.50	6.43	490	299	239	185.3	35.1	46.4
		Pore	36.5	112000	4.47	6.20	460	301	265	219	64.6	145.2
	6-10	Top	0.87	9500	4.68	5.08	480	392	345	244	49.4	236.2
		Pore	0.87	9500	4.32		489	na	368	n	74.4	na
	10-60 R	Top	0.32	1000	4.97	4.84	-54	385	243	190	87.5	239.3
		Pore	0.32	1000	4.85	4.67	89	389	265	199	158.6	297.5
HG-T1-300	9-36	Top	35.70	134000	4.30	6.11	479	300	424	149.5	116.9	60.9
		Pore	35.70	134000	4.35	6.19	443	239	473	211	185.2	164.5
	37-40	Top	5.91	11800	4.36	3.98	511	503	506	313	84.6	128.2
		Pore	5.91	11800	3.99	4.10	551	514	521	325	97.8	89.8
HG-T2-0	27-29	Top	1.25	9000	4.28	4.44	439	462	83.9	74.9	9.8	9.4
		Pore	1.25	9000	4.28	4.40	475	483	85.1	76.4	11.6	9.7
	29-50	Top	3.13	78400	3.17	3.55	574	570	512	376	106.9	307.4
		Pore	3.13	78400	3.16	3.55	580	531	524	399	123.9	370.1
	50-57	Top	2.91	3400	2.90	2.92	715	710	624	464	122.9	129.5
		Pore	2.91	3400	2.90	2.88	729	728	629	452	123.6	129.8
	57-65	Top	0.67	1400	3.27	3.34	581	663	254	210	42.1	48.7
		Pore	0.67	1400	3.24	3.36	589	677	244	216	44.3	43.6
	65-71	Top	0.45	9500	3.00	3.03	634	651	464	343	82.1	86
		Pore	0.45	9500	2.96	3.36	643	664	470	339	83.6	88.2

App3-Table 5c: Data for Acidity figs (Jars with Top water pH <5)

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	29-Oct-01 pH 1187 days	15-Apr-02 pH 1355 days	29-Oct-01 Eh, mv 1187 days	15-Apr-02 Eh, mv 1355 days	29-Oct-01 Cond, us/cm 1187 days	15-Apr-02 Cond, us/cm 1355 days	29-Oct-01 Acidity, mg/ L 1187 days	15-Apr-02 Acidity, mg/ L 1355 days
HG-T2-100	2-24	Top	0.33	2800	4.89	6.12	343	288	168	260	100.9	223.5
		Pore	0.33	2800	4.61	6.14	348	263	198	343	176.8	422.6
HG-T2-25	4-10	P	0.28	3300	4.92	6.60	416	181	320	275	196.3	69
HG-T2-50	0-2	Top	12.34	165000	3.64	5.94	492	277	349	309	81.8	328.6
		Pore	12.34	165000	3.59	6.00	563	246	509	385	267.1	623.5
	2-10	P	0.12	430	4.55	4.33	-116	433	259	194	205.6	442.6
LSH-T3-50	1-3	P	1.11	8500	4.80	5.20	423	467	73.8	60	9.1	7.9
	3-6	Top	8.37	4800	4.35	4.52	534	464	327	185	48.3	78.2
		Pore	8.37	4800	4.15	4.29	508	480	342	199	70.5	151.5
	6-15	P	0.86	960	4.17	4.37	496	450	294	289	65.5	650.7
LSH-T3-75	24-34	Top	15.24	13400	4.62	6.22	478	292	170	185	34.7	146.8
	63-73	Top	0.43	3200	4.57	5.82	426	326	193	183.8	177.6	63.9
		Pore	0.43	3200	4.53	5.09	424	379	212	198.1	205.6	153.2
LSH-T3-400	2-7	Top	1.69	3800	4.59	6.30	490	316	412	131	59.3	24.5
		Pore	1.69	3800	4.29	5.71	512	357	429	132	64.4	36.9
	7-52	Top	0.35	1000	4.53	5.76	444	358	167	170.8	137.0	30.7
		Pore	0.35	1000	4.49	5.49	187	377	176	170.9	178.3	45.2
LSH-T4-20	21-36	P	2.58	1300	4.74	5.00	231	376	187	193.5	87.1	200.5
	36-44	P	0.32	8500	4.92	4.87	445	484	78.9	51	8.7	8.3
LSH-T4-34	0-10	Top	16.68	66000	4.45	6.05	493	345	179	145.8	46.4	49
		Pore	16.68	66000	4.27	5.70	494	369	179	140.5	49.9	56.2
	22-32	Top	7.08	12600	4.22	6.22	383	324	240	272	139.1	381.4
		Pore	7.08	12600	4.15	5.95	493	291	371	253	60.2	168.3
	10-22	P	2.09	3200	4.76	5.38	489	315	391	327	79.2	414.4
HG North Large Pond		Top	0.66	690	4.59	5.49	371	273	247	212	167.1	96.4
		Pore	0.66	690	4.46	5.19	362	260	335	232	423.5	189.2
				Min	**4.97**	**6.60**	**-116**	**181**	**74**	**48**	**8**	**8**
				Max	**2.90**	**0.00**	**729**	**728**	**629**	**464**	**424**	**651**
				Avg	**3.79**	**1.75**	**420**	**410**	**294**	**220**	**112**	**169**

Jars with potato waste addition.

App3-Table6a : Comparison of water pH (>5) for Top and Pore water

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH 29-Oct-01	pH 15-Apr-02
HG-T1-150	35-69 R	T	0.17	1400	5.02	5.63
LSH-T4-34	10-22	T	2.09	3200	5.03	5.32
HG-T1-0	32-71 R	P	2.97	470	5.03	4.26
HG-T2-50	10-38	T	0.08	1200	5.05	5.10
HG-T2-75	3-18	P	8.52	81200	5.05	6.11
LSH-T4-20	36-44	T	0.32	8500	5.05	4.89
LSH-T3-75	14-24	P	19.05	116000	5.06	6.08
HG-T1-100	4-10	T	0.70	2000	5.06	5.55
LSH-T3-50	1-3	T	1.11	8500	5.06	5.36
HG-T2-50	2-10	T	0.12	430	5.07	4.35
LSH-T3-50	6-15	T	0.86	960	5.15	4.39
HG-T2-50	10-38	P	0.08	1200	5.18	5.19
HG-T1-0	0-20	P	1.55	7600	5.20	5.95
HG-T1-250	0-5	T	0.22	870	5.26	4.88
HG South Pond	HG South Pond	T	42.97	72500	5.28	5.588
HG-T1-150	4-6	T	0.75	23700	5.28	6.28
HG-T2-25	48-57	T	0.19	1800	5.30	6.36
HG-T2-75	37-140	T	1.48	22300	5.31	5.82
HG-T1-0	0-20	T	66.51	2400	5.32	5.65
HG-T1-150	0-4	T	1.12	19100	5.33	5.89
LSH-T3-75	73-78	T	0.13	660	5.33	6.12
HG-T1-100	0-4	P	0.53	3800	5.36	6.06
HG-T2-75	37-140	P	1.48	22300	5.38	6.21
LSH-T3-330	39-72	P	1.15	3300	5.39	5.14
HG-T1-0	0-20	P	66.51	2400	5.40	5.60
HG-T1-150	0-4	P	1.12	19100	5.40	5.65
HG-T1-150	4-6	P	0.75	23700	5.40	6.09
HG-T1-100	18-42	T	0.09	910	5.41	5.85
LSH-T3-330	0-33	P	0.29	860	5.42	6.08
HG-T2-100	25->	P	0.24	1300	5.43	5.40
LSH-T4-20	0-21	T	18.11	46800	5.46	5.77
HG-T2-100	25->	T	0.24	1300	5.47	5.35
LSH-T3-75	0-14	T	16.30	50400	5.47	6.68
HG-T2-25	48-57	P	0.19	1800	5.49	6.24
HG-T2-25	10-48	T	0.10	620	5.50	6.93
LSH-T4-20	0-21	P	18.11	46800	5.50	5.64
LSH-T3-75	24-34	P	15.24	13400	5.54	6.10
HG-T1-100	18-42	P	0.09	910	5.54	5.90
LSH-T3-75	73-78	P	0.13	660	5.57	6.05

App3-Table6a : Comparison of water pH (>5) for Top and Pore water

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH 29-Oct-01	pH 15-Apr-02
LSH-T3-50	0-1	P	9.13	1500	5.57	6.32
LSH-T4-20	21-36	T	2.58	1300	5.58	5.19
HG-T1-200	2-65	T	0.87	13000	5.60	6.14
HG-T1-0	0-20	T	1.55	7600	5.61	5.88
HG-T2-75	38-52	T	15.20	209000	5.61	6.33
HG-T2-0	10-27	T	0.89	23600	5.63	5.69
HG-T2-50	38-65	P	0.12	670	5.66	5.45
LSH-T3-330	0-33	T	0.29	860	5.67	6.79
HG South Pond	HG South Pond	P	42.97	72500	5.68	6.186
HG-T2-25	10-48	P	0.10	620	5.68	6.68
LSH-T3-330	39-72	T	1.15	3300	5.68	5.08
HG-T2-75	18-38	T	13.77	224000	5.68	6.50
HG-T2-0	10-27	P	0.89	23600	5.71	5.66
LSH-T3-75	40-63	T	0.11	430	5.73	5.83
HG-T1-250	11-15	P	0.19	2200	5.73	6.00
LSH-T3-50	0-1	T	9.13	1500	5.75	6.25
Seahorse T3 Pond	Seahorse T3 Pond	T	8.52	44400	5.76	6.44
HG-T1-0	32-71 R	T	2.97	470	5.78	4.24
LSH-T3-75	40-63	P	0.11	430	5.79	5.97
HG-T1-100	10-18	T	0.27	590	5.80	4.99
HG-T1-250	5-7	P	0.15	690	5.81	5.60
HG-T1-250	11-15	T	0.19	2200	5.86	5.89
HG-T1-250	5-7	T	0.15	690	5.87	5.71
HG-T2-75	3-18	T	8.52	81200	5.88	6.25
LSH-T3-50	15-28	T	0.15	550	5.89	6.07
HG-T2-50	38-65	T	0.12	670	5.96	5.48
HG-T1-200	2-65	P	0.87	13000	5.97	6.17
LSH-T3-330	33-39	T	0.11	960	5.98	5.97
LSH-T3-75	0-14	P	16.30	50400	5.99	6.67
LSH-T3-50	15-28	P	0.15	550	6.00	6.13
				Min	**6.00**	**6.93**
				Max	**5.02**	**4.24**
				Avg	**5.41**	**5.29**

Jars with potato waste addition.

App3-Table6b : Comparison of water pH (>6) for Top and Pore water

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH 29-Oct-01	pH 15-Apr-02
LSH-T3-330	33-39	P	0.11	960	6.02	6.00
LSH-T3-75	14-24	T	19.05	116000	6.02	6.18
HG-T1-100	42-60	T	0.10	620	6.02	6.12
HG-T2-25	4-10	T	0.28	3300	6.04	6.82
HG-T2-75	18-38	P	13.77	224000	6.04	na
HG-T1-100	42-60	P	0.10	620	6.06	6.12
HG-T1-80	0-5	P	1.10	5900	6.08	6.51
HG-T1-150	6-11	P	0.35	2100	6.10	6.72
HG-T1-150	6-11	T	0.35	2100	6.12	6.90
HG-T2-0	0-10	T	2.15	5000	6.14	5.97
HG-T2-75	0-3	T	9.40	51900	6.17	6.40
HG-T1-200	0-1	P	1.48	24700	6.18	6.52
HG North Small Pond R	HG North Small Pond R	T	10.02	64200	6.23	6.61
HG-T2-0	0-10	P	2.15	5000	6.27	6.48
HG-T1-290	10-60	T	0.32	1000	6.30	6.30
Seahorse T3 Pond	Seahorse T3 Pond	P	8.52	44400	6.31	6.47
HG-T1-50	4-60	T	0.13	410	6.36	7.13
HG-T1-80	0-5	T	1.10	5900	6.37	6.35
HG-T1-300	0-9	T	48.61	116000	6.38	6.18
HG-T1-100	0-4	T	0.53	3800	6.40	6.17
HG-T1-290	10-60	P	0.32	1000	6.42	6.72
HG North Small Pond R	HG North Small Pond R	P	10.02	64200	6.44	6.65
HG-T1-200	0-1	T	1.48	24700	6.45	6.59
HG-T1-50	4-60	P	0.13	410	6.47	7.02
HG-T1-300	0-9	P	48.61	116000	6.50	6.33
HG-T1-150	35-69	P	0.17	1400	6.50	6.90
HG-T2-75	0-3	P	9.40	51900	6.51	6.43
HG-T1-300	0-9 R	T	48.61	116000	6.51	6.76
HG-T1-300	0-9 R	P	48.61	116000	6.52	6.58
HG-T1-200	1-2	T	0.22	850	6.56	6.94
HG-T1-150	35-69	T	0.17	1400	6.59	6.77
LSH-T3-50	28-63	P	0.14	32600	6.60	6.33
LSH-T3-50	28-63	T	0.14	32600	6.61	6.20
HG-T1-200	1-2	P	0.22	850	6.61	6.89
HG North Small Pond	HG North Small Pond	P	10.02	64200	6.61	6.84
HG-T1-150	11-35	T	0.11	740	6.61	6.96
HG-T2-25	0-4	P	4.35	38900	6.64	6.43
HG-T1-80	9-41	P	0.15	820	6.68	7.02
HG-T1-80	9-41	T	0.15	820	6.70	7.24
HG North Small Pond	HG North Small Pond	T	10.02	64200	6.75	6.97
HG-T2-100	0-2	P	7.35	145000	6.77	6.72
HG-T1-150	11-35	P	0.11	740	6.85	6.92
HG-T1-80	5-6	P	0.90	13000	6.86	6.58
HG-T1-80	5-6	T	0.90	13000	7.01	6.46
HG-T2-100	0-2	T	7.35	145000	7.03	6.92
HG-T2-25	0-4	T	4.35	38900	7.36	6.73
HG-T1-50	0-4	T	0.88	23800	na	5.51
HG-T1-50	0-4	P	0.88	23800	na	5.64
HG-T1-80	5-9	T	0.70	16900	na	6.14

App3-Table6b : Comparison of water pH (>6) for Top and Pore water

Location	Depth (cm)	Top / Pore Water	L.O.I%	Fe in sed, mg/kg	pH 29-Oct-01	pH 15-Apr-02
HG-T1-80	5-9	P	0.70	16900	na	6.08
HG-T1-250	15-26	T	0.15	410	na	6.26
HG-T1-250	15-26	P	0.15	410	na	6.38
HG-T1-300	40-60	T	0.13	650	na	5.83
HG-T1-300	40-60	P	0.13	650	na	5.92
HG-T2-75	38-52	P	15.20	209000	na	na
LSH-T3-75	34-40	T	1.04	5200	na	4.67
LSH-T3-75	34-40	P	1.04	5200	na	na
LSH-T3-540	Lichen	T	2.10	3500	na	4.27
LSH-T3-540	Lichen	P	2.10	3500	na	na
LSH-T4-34	32-44	T	1.31	7500	na	5.16
LSH-T4-34	32-44	P	1.31	7500	na	4.75
				Min	**7.36**	**7.24**
				Max	**6.02**	**5.97**
				Avg	**6.36**	**6.48**

Jars with potato waste addition.

App3-Table 7a: Changes in Chemistry of Top Water for Jars Never Received Potato Waste

Statistic Parameter	pH				Cond, us/cm				Eh, mv			
	original pH < 5		original pH > 5		original pH < 5		original pH > 5		original pH < 5		original pH > 5	
	7 °C	22 °C	7 °C	22 °C	7 °C	22 °C	7 °C	22 °C	7 °C	22 °C	7 °C	22 °C
N-jar	1	1	7	7	1	1	7	7	1	1	7	7
N-measured	10	7	73	48	10	7	74	48	10	7	74	48
Min	4.85	5.72	4.26	3.79	136	136	31	37	-4	157	9	-98
Max	6.52	6.27	7.26	7.26	544	198	93	640	670	293	771	460
Avg	5.63	6.06	5.23	5.02	360	172	461	171	329	213	429	269

	Acidity, mg/L				Alkalinity, mg/L			
	original pH < 5		original pH > 5		original pH < 5		original pH > 5	
	7 °C	22 °C	7 °C	22 °C	7 °C	22 °C	7 °C	22 °C
N-jar	1	1	42	7	1	1	7	7
N-measured	7	1	49	7	2	1	13	7
Min	8	50	2.8	6	1	44.1	0.8	2.5
Max	425	50	748	358	4	44.1	137	155
Avg	107	50	24.6	81.7	3	44.1	19.3	60

App3-Table 7b: Changes in Chemistry of Top Water for Jars Received 2g Potato Waste

Statistic Parameter	pH						Cond, us/cm						Eh, mv					
	original pH < 5			original pH > 5			original pH < 5			original pH > 5			original pH < 5			original pH > 5		
	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C
	Bef PW	Aft PW		Bef PW	Aft PW		Bef PW	Aft PW		Bef PW	Aft PW		Bef PW	Aft PW		Bef PW	Aft PW	
N-jar	21	21	21	26	26	26	20	20	20	26	26	26	20	20	20	26	26	26
N-measured	105	124	126	130	155	181	100	120	140	130	153	182	100	120	140	130	153	182
Min	2.88	3.17	3.17	4.10	4.24	3.89	29	28	110	38	38	18	409	-475	33	375	-360	-16
Max	7.27	6.76	7.22	7.14	7.01	6.92	612	734	654	406	1270	890	763	954	494	860	865	444
Avg	3.84	4.30	4.77	5.20	5.10	5.28	133	309	284	138	317	302	551	271	201	581	254	181

	Acidity, mg/L						Alkalinity, mg/L					
	original pH < 5			original pH > 5			original pH < 5			original pH > 5		
	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C	7 ^{o}C		22 ^{o}C
	Bef PW	Aft PW		Bef PW	Aft PW		Bef PW	Aft PW		Bef PW	Aft PW	
N-jar	20	20	20	26	24	26	20	no measurement	20	26	no measurement	26
N-measured	100	40	20	130	50	26	40		20	52		26
Min	2.80	17.1	9.0	1.80	18.7	9.6	0.0		0.0	0.0		43.1
Max	98.8	445	228	120.0	1528	342	52.5		184.3	69.7		322.7
Avg	21.3	137	69	20.5	192	109	6.3		101.0	4.6		135.7

App3-Table 7c: Changes in Chemistry of Top Water for Jars Received 5g Potato Waste

Statistic Parameter	pH						Cond, us/cm						Eh, mv					
	original pH < 5			original pH >5			original pH < 5			original pH >5			original pH < 5			original pH >5		
	Bef PW		Aft PW	Bef PW		Aft PW	Bef PW		Aft PW	Bef PW		Aft PW	Bef PW		Aft PW	Bef PW		Aft PW
	7 ^{o}C	22 ^{o}C		7 ^{o}C	22 ^{o}C		7 ^{o}C	22 ^{o}C		7 ^{o}C	22 ^{o}C		7 ^{o}C	22 ^{o}C		7 ^{o}C	22 ^{o}C	
N-jar	5	5	5	33	33	33	5	5	5	33	33	33	5	5	5	33	33	33
N-measured	40	10	20	260	66	132	38	10	20	262	66	132	38	10	20	262	66	132
Min	2.84	2.74	3.11	4.28	4.35	3.57	28	42	287	14	24	185	281	311	-179	178	141	-176
Max	7.03	6.77	5.27	7.36	7.14	6.91	117	99	978	698	502	1618	775	432	359	1196	677	395
Avg	3.37	3.13	3.97	5.40	5.32	4.38	57	56	525	95	81	508	473	360	166	529	360	195

Statistic Parameter	Acidity, mg/L				Alkalinity, mg/L			
	original pH < 5		original pH >5		original pH < 5		original pH >5	
	Bef PW	Aft PW	Bef PW	Aft PW	Bef PW	Aft PW	Bef PW	Aft PW
	7 ^{o}C	22 ^{o}C	7 ^{o}C	22 ^{o}C	7 ^{o}C	22 ^{o}C	7 ^{o}C	22 ^{o}C
N-jar	5	5	33	33	5	5	32	33
N-measured	33	5	229	33	10	5	64	33
Min	3.1	229	1.8	20.9	3.1	102	0.0	0.0
Max	41	520	130	2023	14	877	64	1141
Avg	12	370	13	384	8	278	6	279